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A Masculine Tribe –
Gender-Specific Constructs of the Natural Sciences in Carl Djerassi's Literary Works

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For my children.

And for the little girl who once dreamed of studying at a university –
look how far you have come and how much more you have achieved!

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List of abbreviations

The primary texts by Carl Djerassi referred to in this thesis will be cited as follows:

AIM: *An Immaculate Misconception. Sex in an Age of Mechanical Reproduction.*
CD: *Cantor's Dilemma*
MS: *Menachem's Seed*
NO: *NO*
OXY: *Oxygen*
PH: *Phallacy*
STG: *Stammesgeheimnisse*
TBG: *The Bourbaki Gambit*
TMP: *This Man's Pill*

1 Introduction and Previous Research

Doing science… objectively?

If you think you're objective, and your work is based on objectivity, and there's this myth of meritocracy, then of course you're not going to want to hear this.[1]

- Alison Coil, astrophysicist (2018)

Rooted in the widespread belief in progress, the relevance of the natural sciences – and their associated domains, such as scientific discovery, research, institutions, and education – often goes unquestioned. Despite a recent rise in skepticism towards science, particularly in the context of ideological conflicts in western countries like the United States, the natural sciences are highly trusted and respected. Especially since the Enlightenment, western cultures have celebrated science as both a fundamental driver of progress and an expression of rational thought. These narratives have contributed to enduring and idealized images of the scientist and the scientific endeavor: the scientist is portrayed as motivated by curiosity and a thirst for knowledge, posing questions about the world, exploring the unknown, conducting rigorous experiments and ultimately, confirming hypotheses that enhance our understanding of reality. Driven by idealism and committed to objectivity, the scientist is imagined as leaving behind personal biases, interests, and subjective influences at the laboratory door – acting solely in the interest of scientific truth.

So far, a stereotypical but also widely accepted image. The concept of scientific objectivity has been widely debated, particularly in the philosophy of science, yet also in feminist studies. It is generally understood as "the idea that scientific claims, methods, results – and scientists themselves – are not, or should not be, influenced by particular perspectives, value judgments, community bias or personal interests" (Reiss & Sprenger 2020). This definition implicitly addresses a significant problem of scientific objectivity: the scientist. As scientists are human, they are subject to cognitive biases and cultural norms.

[1] Paulson, Amanda. 2018. "For women in science, busting barriers is just part of the job." *The Christian Science Monitor*, 26 March 2018. < https://www.csmonitor.com/Science/2018/0326/For-women-in-science-busting-barriers-is-just-part-of-the-job>

Unsurprisingly, the concept of scientific objectivity has been challenged from feminist perspectives. Feminist epistemology, for instance, investigates the "impact of sex and gender on the creation of scientific knowledge", such as the "systematic exclusion of women from the ranks of scientists, and the neglect of women as objects of study" (ibid.). Notable examples include the ignorance of the female orgasm in biology or conducting medical drug trials on men only (cf. ibid.). Philosopher Helen Longino challenges the notion of (pure) objectivity in science and argues that scientific inquiry, like all forms of human knowledge, is socially situated. Longino points towards the necessary distinction "between objectivity as a characteristic of scientific method and objectivity as a characteristic of individual scientific practitioners or of their attitudes and practices" (Longino 1990, 66). Questioning the latter ultimately leads to recognizing the social nature of scientific practice.

Unlike traditional notions of portraying science as objective and detached from values, Longino's framework understands science as a collaborative process influenced by social values, yet still capable of producing rational and reliable knowledge (cf. Reiss & Sprenger 2020).[2] In reference to Marjorie Grene's 1984 essay "Perception, Interpretation, and the Sciences", Longino states three aspects of the social character of the sciences:

> One [Grene] sees as the existence of the scientific disciplines as "social enterprises," the individual members of which are dependent on one another for the conditions (ideas, instruments, et cetera) under which they practice. Another related aspect is that initiation into scientific inquiry requires education. One does not simply declare oneself a biologist but learns the traditions, questions, mathematical and observational techniques, "the sense of what to do next," from someone who has herself or himself been through a comparable initiation and then practiced. One "enters into a world" and learns how to live in that world from those who already live there. Finally, as the practitioners of the sciences all together constitute a network of communities embedded in a society, the sciences are also among a society's activities and depend for their survival on that society's valuing what they do. (Longino 1990, 67)

Longino, with reference to historian of philosophy Grene, does not reject science as unreliable or merely subjective – rather, she frames it as a *cultural* practice, shaped by human values. Following the definition of culture by *The Cambridge Dictionary* as "the attitudes, behaviour, opinions, etc. of a particular group of people" ("Culture"), science is socially organized and shaped by shared values and norms. Longino thus suggests contextual empiricism as an alternative model to the traditional notion of

[2] In light of recent anti-science movements and policies – such as those enacted by the Trump administration – I consider it important to clarify that my critique of objectivity in science is not a challenge to the integrity or credibility of science itself.

objectivity in science. In this way, objectivity is achieved through critical dialog in scientific communities (cf. Longino 1990, 74 f.). Longino remarks: "What I wish particularly to stress is that the objectivity of scientific inquiry is a consequence of this inquiry being a social, and not an individual, enterprise." (Longino 1990, 67)

Science as a culture

In *Life Among the Scientists* (1989), the fascinating anthropological study of a community of scientists at the prestigious Walter and Eliza Hall Institute of Medical Science in Melbourne, Australia, Max Charlesworth and his colleagues demonstrate how 'doing science' is shaped by *cultural* factors. As Charlesworth et al. observed in their study, the group of research scientists at question "has its own distinctive set of shared beliefs and attitudes and practices and assumptions and expectations" (Charlesworth et al. 1989, 3). Apart from having "its own language" and "its own distinctive rituals", Charlesworth and his colleagues attest science "its own heroic stories and sustaining myths" (ibid.). A central myth in the culture of science is "the myth of 'pure science'", which is closely connected to the notion of objectivity in science (Charlesworth et al. 1989, 99). Charlesworth et al. explain: "According to the myth, there is a sharp distinction between the domain of science, which is morally and politically neutral or 'value free', and the domain of moral and social values." (ibid.) Moreover, Charlesworth et al. identify a direct connection between the concept of 'pure' science and the distinction between 'hard' and 'soft' sciences:

> It may be that in the social sciences – the 'soft' sciences – personal and subjective factors play a part in the scientist's mode of theorizing, in the selection of an area of research interest and in dictating the style of research; but in the 'hard' sciences, so it is claimed, these factors have no place. (Charlesworth et al. 1989, ibid.).

Contrary to these assumptions, Charlesworth et al. attest the scientists in their study "competitiveness and a good deal of personal friction" (Charlesworth et al. 1989, 109). In order to be successful, one the scientists in the study claims that a "sucessful [sic!] scientist needs to have 'a lot of ego'" (Charlesworth et al. 1989, 111). Furthermore, "you must […] be confident, even aggressive" and "if you are after a Nobel Prize you need a good deal of self-promotion and the ability to win friends and influence people in the right quarters." (ibid.) Or in other words: "The image of the gentle, contemplative scientist gazing in childlike wonder at the workings of Nature (as in that marvelous photograph of Einstein) is strictly for the birds." (ibid.)

Apart from the scientists they observed in their study, Charlesworth et al. also discuss a real-life example of a scientist who, in their view, embodies the characteristics previously described: "Referring to Watson of DNA fame, the English scientist Peter Medawar claims that most scientists are historically and sociologically unreflective about their science. They are interested, he says, only in the present state of the art." (Charlesworth et al. 1989, 15) In fact, American molecular biologist and 1962 Nobel Prize winner James D. Watson has written several autobiographies, mostly dealing with his exceptional career in science. In his 2007 autobiography *Avoid Boring People and Other Lessons from a Life in Science* – as narrative tracing his life in science from childhood to his resignation from teaching at Harvard University in 1976 – Watson concludes each chapter with "remembered lessons" drawn from each stage of his journey. While the majority of each chapter is written in free prose, the "remembered lessons" are presented as numbered lists. At the end of the book, these lessons are compiled into a comprehensive overview which almost appear like a manifesto for young scientists – something that could be easily copied and posted in a prominent workspace, such as a lab, as a daily reminder of Watson's advice.

Watson's "remembered lessons" range from "Choose a young thesis adviser" (Watson 2007, 50) "Work on Sundays" (Watson 2007, 70), "Have a big objective that makes you feel special" (Watson 2007, 90) to "Stay in close contact with your intellectual competitors" (Watson 2007, 114), "Run a benevolent dictatorship" (Watson 2007, 282), and "Institutions are either moving forward or they are moving backward" (Watson 2007, 312). Watson presents science as driven by ambition and competition, highlighting the crucial roles of mentors, collaborators, and social alliances. Within this context, he stresses the value of establishing scientific networks and cultivating contact with scientists from other laboratories, asserting that "getting to know your colleagues can only help you get a piece of the prize" (ibid.). Repeatedly, Watson underscores that success in science depends as much on personal connections as on knowledge, thereby revealing the often-overlooked underlying social dynamics underpinning the scientific community.

In recent years, public discourse has increasingly mentioned Watson not for his scientific achievements but as a prime example of how female scientists are often denied the recognition they deserve in major scientific projects. In 1953, Watson and his colleague Francis Crick used the now-famous 'Photograph 51' – an X-ray image taken by biochemist and crystallographer Rosalind Franklin – without her consent. This image became the foundation for their subsequent double helix model, which was ultimately rewarded the Nobel Prize. Franklin's significant contributions were made

invisible – and her early death in 1958 only deepened her erasure. Not only did Watson steal Franklin's research and deprived her of due credit for her work, but in his 1968 memoir *The Double Helix. A Personal Account of the Discovery of the Structure of DNA*, he portrays Franklin in a dismissive and derogatory manner, referring to her as "Rosy", a nickname she reportedly despised, criticizing her appearance and demeanor. Watson asserts that, due to her allegedly "belligerent moods", "Rosy had to go or be put in her place" (Watson 1968, 14). To him, "the best home for a feminist was in another person's lab" (Watson 1968, 15), highlighting both his individual sexist reservations towards his female colleague as well as the systematic marginalization of women in the sciences.

Rather unsurprisingly, the epilog of Watson's autobiography *Avoid Boring People and Other Lessons from a Life in Science* includes a statement suggesting that allegedly innate biological differences between men and women may help explain the underrepresentation of women in science: "Anyone sincerely interested in understanding the imbalance in the representation of men and women in science must reasonably be prepared at least to consider the extent to which nature may figure, even with clear evidence that nurture is strongly implicated." (Watson 2007, 318)[3]

Objectivity and gender in science

The example of Rosalind Franklin illustrates the intersection of alleged objectivity and gender in science – claims of scientific objectivity are often influenced by gender bias. In her famous book *Reflections on Gender and Science* (1985), philosopher Evelyn Fox Keller outlines the historical development of feminist criticism of the natural sciences. While early feminist criticism had focused on the underrepresentation of women in science and emphasized the importance of political and structural efforts to create equal opportunities for female scientists, these critiques then evolved to challenge masculine bias in science. Feminist scholars questioned "the gender neutrality of the very criteria defining 'scientific'" (Keller 1985, 177) – even more, "objectivity itself

[3] Watson further implies that genetic differences between races could account for disparities in intelligence: "A priori, there is no firm reason to anticipate that the intellectual capacities of peoples geographically separated in their evolution should prove to have evolved identically." (Watson 2007, 326) Following these – and other – sexist and racist remarks, Watson faced serious repercussions – he lost his position as chancellor of Cold Spring Harbor Laboratory (CSHL) and was stripped of the honorary titles the institution had previously rewarded him.

came under suspicion as an androcentric goal" (ibid.). Consequently, "some authors concluded that perhaps, after all, science is a masculine project." (ibid.)

The current cultural climate is oriented towards addressing gender-specific issues in science – and compensating for past failures. A central aspect of this is the effort to increase the visibility of forgotten women in science, such as Rosalind Franklin. In recent years, numerous feminist works have drawn attention to the accomplishments of women – not only in science but also in art and literature, for instance – whose contributions have either been overlooked, forgotten, or actively erased. Historian Leonie Schöler refers to this as the phenomenon of "Die Wiederentdeckte Frau", the 'rediscovered woman' (Schöler 2024, 290). These efforts counteract what in sociology has been termed the 'Matilda Effect', a concept introduced by historian Margaret W. Rossiter in 1993 to describe the systematic lack of recognition – or even misattribution – of women's contributions to science. Drawing on the 'Matthew Effect'[4] by sociologist Robert K. Merton, explaining how renowned scientists tend to receive disproportionate credit (cf. Rossiter 1993, 334), Rossiter highlights the legacy of Matilda Joslyn Gage, a 19th century American suffragette who first documented this dynamic (cf. Rossiter 1993, 335)[5]. In addition to Rosalind Franklin, prominent examples of the Matilda Effect include astrophysicist Jocelyn Bell Burnell, physicist Lise Meitner, and mathematician and physicist Mileva Marić, the first wife of Albert Einstein – all of whom were denied recognition for significant scientific contributions, some of which remain largely unacknowledged to this day.

Evidently, gender plays a significant role in revealing the blind spots within the supposed objectivity in the natural sciences. It is therefore unsurprising that, in recent years, the relationship between gender and science has gained significant attention in popular culture as well. One notable example is the 2022 global bestseller *Lessons in Chemistry* by Bonnie Garmus. The novel follows the story of Elizabeth Zott, a talented chemist in 1960s America, who faces severe sexual discrimination both in her professional as well as her private life. After being sexually assaulted by a senior male

[4] The Matthew Effect is named after a verse in the Gospel of Matthew: "For whomsoever hath, to him shall be given, and he shall have more abundance; but whomsoever hath not, from him shall be taken away even that he hath." (Matthew 13:12) Rossiter notes that the Matilda Effect may extend even to the Scriptures, citing claims by some Biblical scholars that "an obscure figure known as Priscilla (or Prisca) wrote certain parts of the Scriptures" (Rossiter 1993, 334). To this day, scholars remain divided on the accuracy of this theory. As journalist Rebekka Endler aptly puts it in *Das Patriarchat der Dinge* (2021): "The fact that, to this day, no one knows whether Priscilla/Prisca is a biblical example of the Matilda Effect reveals the very core of the problem." (Endler 2021, 38, translation DSS).

[5] Ironically, Merton himself was guilty of the Matilda Effect. As Rossiter points out, he failed to credit his collaborator Harriet Zuckerman, "who did most of the work on which the 'Matthew Effect' was based and should have been acknowledged as co-author (as he has himself since admitted)" (Rossiter 1993, 334).

scientist, Zott loses her research position because she refuses to apologize for stabbing her rapist in self-defense. She then unexpectedly becomes the host of a television cooking show, subtly teaching women about chemistry. In this story of female empowerment, the natural sciences are portrayed as gender-biased spaces, where men hold the power and hinder the professional potential of women. To date, *Lessons in Chemistry* has sold over 8 million copies and was adapted into a miniseries starring Brie Larson (cf. Bartoy 2025), reflecting the substantial public interest in the topic of gender in science.

Several decades before Garmus, Carl Djerassi also directs his attention to the world of science in his literary works – though from a different angle – with a particular focus on women in science. His literary works offer valuable insights into how scientific practice is, in fact, governed by subjective factors. Given Djerassi's unique position as a scientist-turned-author, I consider it worthwhile to first present some key aspects of his biography before examining the significance of his self-defined literary genres of 'Science-in-Fiction' and 'Science-in-Theater'[6].

About Carl Djerassi – and "his" literary genre

Austrian-American Carl Djerassi, born in Vienna in 1923, was a pioneering chemist, best known for his 1951 synthesis of norethisterone, a progestin which paved the way of developing the first oral contraceptive pill. Educated in the United States, he played a major role in advancing the field of organic chemistry, including his work on steroids and promoted new approaches to insect control. He published over 1,200 scientific papers and received numerous awards – he is one of two Americans who was awarded both the National Medal of Science and the National Medal of Technology. For nearly four decades, he taught at Stanford University and received overall 34 honorary doctorates for his achievements in chemistry – with one exception: in 2009, he received an honorary degree from the Faculty of Cultural Studies of TU Dortmund University, Germany for his literary works.

In the 1980s, at an age when many individuals retire, Carl Djerassi embarked on a second career – as a writer. Why would a world-famous chemist become a writer of novels and plays – and also, of poetry and non-fiction? Djerassi blames the Pill for his transformation from chemist to writer, and, ultimately, from novelist to

[6] Even though Carl Djerassi refers to the literary genre as "Science-in-Theatre" with a British spelling, I am using the term with the American spelling for the sake of linguistic consistency.

playwright. In his essay collection *This Man's Pill. Reflections on the 50th anniversary of the Pill* (2001), Djerassi recalls one of his first widely read scientific papers, published in 1970 in *Science* magazine. Curiously, this paper "contained not a single chemical formula" and instead addressed "an issue that had simply been brushed aside at that time: What political, legal, and economic steps are needed to create fundamentally new methods of birth control?" (TMP 162). Empowered by the success of this paper – and certainly also influenced by his third wife, Stanford literary studies professor Diane Middlebrook – Djerassi published his first popular non-fiction work in 1981. In *The Politics of Contraception*, he discusses the role of birth control in the present and the future, considering it from the perspectives of science, industry, and public policy. In 1989, he released his first major work of 'Science-in-Fiction', the novel *Cantor's Dilemma*. Until his death in 2015, Djerassi continued to write prolifically, producing numerous novels, plays, and autobiographies. His artistic interest extended beyond literature: he is the founder of the Djerassi Resident Artists Program near Woodside, California, and was an avid art collector, particularly of works by Paul Klee.

In a dual sense, Djerassi's literary works can be understood as literature of exile. As an Austrian Jew, he fled the Nazi regime in 1939 and emigrated to the United States. As a scientist, he wrote about science from the perspective of a former insider, having ended his active scientific career around 1990. His writing provides a hybrid perspective on the sciences, enabling unique insights into what he considers the hermetic culture of the sciences while also allowing for criticism from the position of distance. Moreover, Djerassi's knowledge of the sciences offers the opportunity to bridge "the gulf between the two cultures", ergo the sciences and the humanities (Hargittai 2000, 90). In an interview conducted by Hungarian chemist Istvan Hargittai, Djerassi points out:

> This is the mission. This gulf is one of the most important social problems today, the gulf between the scientifically literature constituency, which is a very small portion of the population, and the intelligent literate community which is scientifically totally illiterate. This is also part of the reason for chemophobia in contemporary society. The important factor, of course, is the readership, and this is why I decided to use fiction. I call it "science-in-fiction" because I'd like to smuggle concepts of scientific culture of behavior into the conscience of people who are not interested in science. (ibid.)

Djerassi's literary works challenge boundaries not only regarding their content but also through their form, as they seek to define existing literary genres. To distinguish his works from science fiction, he uses the terms 'Science-in-Fiction' and 'Science-in-Theater'. In his essay, "Contemporary 'Science-in-Theatre': A rare genre" (2005), Djerassi provides a detailed explanation of this approach. Central to his definition is

the insistence that "all the science and behavior of scientists described is impeccably accurate" (Djerassi 2005), marking the most significant difference to science fiction works. Within this framework, Djerassi clearly articulates the didactic goal of his literary works: "I want to use fiction to smuggle scientific facts into the consciousness of a scientifically illiterate public" (ibid.). To fulfill this pedagogical mission, "accuracy and plausibility" of the science in his plays (and novels) are "essential" (ibid.).

Djerassi criticizes what he considers unjustified criticism of didacticism in literary works, remarking that the didactic is "the sharpest stiletto in any dismissive review of a work of fiction or drama" (ibid.). He argues that literary critics often use the term with a "pejorative undertone" (ibid.), a notion he vehemently rejects. Instead, he supports the definition of didactic as "intended to convey instruction and information, as well as pleasure and entertainment" (ibid.). Consistently, he aligns himself with the classical principle articulated by Roman poet Quintus Horatius Flaccus, commonly known as Horace: "'Lectorem delectando pariterque monendo' [delighting the reader at the same time as instructing him" (ibid.). In a tongue-in-cheek manner, Djerassi observes that "any playwright openly admitting to […] a didactic impulse risks accusations not only of didacticism, but also of a masochistic desire for instant infanticide of a play barely written" (TMP 246). Nonetheless, Djerassi's firm belief in the didactic purpose of his literary works compels him to pursue this approach, regardless of criticism.

In Djerassi's view, the science featured in Science-in-Fiction novels and Science-in-Theater plays is not merely a means to carry the plot. As he emphasizes, "it is not sufficient to simply insert here or there some science into a play or have some characters that are not just Frankensteins, Strangeloves or idiot savants" (Djerassi 2005). Literary scholar Eva-Sabine Zehelein similarly argues in *Science: Dramatic* (2009) that the plot must be "firmly rooted in the scientific topics and/or context", ensuring that "science is not merely a metaphor, but the narrative heart and soul" (Zehelein 2009, 105). Based on these criteria, relatively few novels and plays genuinely qualify as Science-in-Fiction and Science-in-Theater works. Djerassi acknowledges that there are "plays – admittedly few, but important ones and written by famous playwrights – that have scientific thematic themes", yet do not conform to his definition of Science-in-Theater, including Brecht's *Life of Galileo* (1939) and Dürrenmatt's *The Physicists* (1962) (Djerassi 2005). Even Tom Stoppard's play *Arcadia* (1993), despite its complex didactic elements, falls short of Djerassi's definition: He argues that the science in Stoppard's plays is there because "Stoppard decided to write a play for which scientific

concepts are useful and intellectually attractive metaphors. But they are not intrinsic to the story." (ibid.)

Nonetheless, Djerassi does not regard himself as the sole author of Science-in-Fiction novels and Science-in-Theater plays. Among the few plays that truly embody Science-in-Theater is Michael Frayn's *Copenhagen* (1998), which explores the ethical dilemmas faced by physicists Werner Heisenberg and Niels Bohr during World War II. For Djerassi, Frayn "displayed true courage by refusing to concede to scientific illiteracy" (ibid.) and instead

> draws upon quantum mechanics and the uncertainty principle for much of the scintillating interplay between two Nobelists, Werner Heisenberg and Niels Bohr with Margrethe Bohr playing the role of the non-scientists at whose level the didactic passages had to be pitched […]. (Djerassi 2005)

Writing Science-in-Fiction and Science-in-Theater does not, so Djerassi emphasizes, require the author to be a scientist. He cites examples such as Anton Chekov and Arthur Schnitzler, both trained physicians who drew upon their professional knowledge for their literary works. Yet, he asks, why do such few 'hard' scientists become authors of fiction or playwrights? Djerassi considers the nature of the sciences as a significant factor for the lack of scientists in playwrighting:

> Is it because chemists find it difficult to communicate without recourse to blackboard or slides or some other kind of pictogram? Or is it because chemists deal primarily with abstractions at the molecular level, whereas physicians spend their days listening to the stories of other human beings? Even the most scientifically – invested plays succeed, if they do, because they work at the human level. Or is it that all formal written discourse of scientists is always monologist, whereas the theatre is the realm of dialogue? (Djerassi 2005)

Djerassi hereby implicitly highlights another key characteristic of Science-in-Fiction and Science-in-Theater: the portrayal of the distinct – as he claims, *tribal* – culture of the sciences. Interestingly, Charlesworth and his colleagues describe the scientists they studied in similar anthropological terms, viewing them "as though they belonged to a 'tribe' with a distinctive 'culture' of its own" (Charlesworth et al. 1989, 3). Along these lines, Zehelein views a "realistic depiction of the tribal culture of the scientists, ideally by a clansman himself" as a constituent element of Science-in-Theater plays (Zehelein 2009, 105). In Djerassi's novels and plays, this (tribal) culture of science is central – and forms the basis for this thesis. His literary depiction of the culture of science is certainly not uncontroversial, particularly among fellow scientists – unsurprisingly, Djerassi describes his literary endeavor as choosing "to wash dirty lab coats in public" (Grünzweig 2012, 35).

As this thesis will demonstrate, the didactic purpose of Djerassi's literary works extends beyond science itself. His aim is to demystify science and scientific knowledge and render the hermetic culture of the natural sciences more accessible to the general public (cf. TMP 249). Within this exercise of deconstruction, gender emerges as a *foundational* element of the (tribal) culture of science. This thesis argues that Djerassi depicts science as a social enterprise governed – visibly and invisibly – by gender and gender bias. Understanding the sciences as a culture must therefore include recognizing it as a *gendered* culture. Moreover, his didactic mission encompasses these dynamics: his novels and plays serve an educational purpose by critically engaging with gender-specific issues within the scientific culture.

The structure of this thesis

This thesis is divided into five chapters. **Chapter 1** situates my thesis in its broader cultural and literary context. It outlines relevant cultural background and explores the significance of Djerassi's oeuvre, incorporating key biographical information about the author to frame his work. Moreover, this chapter positions this thesis in relation to previous research on Djerassi's literary works. **Chapter 2** investigates Djerassi's use of the tribal metaphor to refer to the cultural characteristics of the natural sciences. I discuss the notions of "tribe" and "tribal" from an anthropological and a cultural perspective, with particular attention to their gender-specific dimensions. The chapter also investigates C. P. Snow's concept of the 'Two Cultures', which serves as a conceptional foundation for Djerassi's literary representation of science.

Chapter 3, the main part of this thesis, provides an in-depth analysis of gender-specific notions in the culture of science as depicted in selected literary works. *Cantor's Dilemma* (1989), Djerassi's first novel, serves as the fundamental and programmatic text in his literary critique of the sciences. I examine the cultural characteristics of the sciences portrayed in the novel and demonstrate how these are inherently gendered – representing science as a distinctly masculine culture. In this context, I pay particular attention to the strategies employed by the female scientists to navigate and succeed within this male-dominated environment. Subsequently, I examine additional selected literary works that further explore the gender-specific dimensions of Djerassi's oeuvre. These include the significance of gender in science as illustrated in historical examples, the role of gender in reproductive technology, the intersection of gender and race within the culture of science, and the interplay between science and the arts.

Following my literary analysis, **chapter 4** situates Djerassi's fictional representation of the natural sciences within a broader context of past and present realities of women in science. Moreover, I explore the feminist potential of Djerassi's literary works with a specific focus on the theory of (Male) Feminist Allyship (2022) by Ben Almassi.

Chapter 5 presents the conclusion of this thesis. It begins with a functional summary of the key findings and proceeds to discuss their broader significance, particularly in light of a growing patriarchal backlash. Additionally, I explore the critical and educational potential of Djerassi's literary works within secondary education, with a focus on the intersection of drama and science. Finally, the **appendix** includes a proposed project-based course for Year 12 or 13 students at *Gymnasium*/*Gesamtschule*, a type of secondary school in Germany, which examines the significance of gender in the culture of science in Djerassi's literary works.

Previous research on Djerassi's literary works

In her 2008 monograph *Der Intellektuelle Polygamist*, Ingrid Gehrke offers the first comprehensive study of Djerassi's oeuvre, focusing on the thematic and formal diversity of his literary works and highlighting the intellectual versatility of the author. Her book combines a detailed discussion of his texts with a portrayal of Djerassi's transition from scientist to writer. Gehrke begins with his autobiographical works – such as *Steroids Made It Possible* (1990), *The Pill, Pygmy Chimps, and Degas' Horse* (1992), and *This Man's Pill. Reflections on the 50th Birthday of the Pill* (2001) – examining both his self-presentation as a scientist and his insider knowledge about the culture of science, the latter becoming a recurring theme in his later fiction.

Gehrke's analysis of Djerassi's Science-in-Fiction novels centers on his first two novels *Cantor's Dilemma* (1989) and *The Bourbaki Gambit* (1994), identifying key characteristics of the culture of science, such as the practice of academic publication, prizes, funding, reputation, and mentor-mentee relationships. She dedicates about seven pages to the role of the female characters in Djerassi's novels, seeing them mainly as engines for the development of the male characters as well as examples for alternative behavior in the culture of science. However, Gehrke underestimates Diana and Charlea, two characters from Djerassi's second novel *The Bourbaki Gambit*, as feminists because they both succeed in their careers by conforming to the masculine rule book of science (cf. Gehrke 2008, 149), revealing an earlier understanding of

feminism that invites a more contemporary gender analysis. Linking her findings to Londa Schiebinger's *Has Feminism Changed Science?* (1999), Gehrke concludes that while Djerassi's novels portray empowered, resilient examples of women in science, they fail to re-gender the natural sciences, with the male characters remaining remarkably static in their masculinity.

Gehrke then examines Djerassi's Science-in-Theater plays, focusing on their scientific themes, many echoed from his novels, and his dramaturgical experiments blending epic and classical forms. She credits drama for offering a greater scope for creative freedom than narrative prose.

Her study also includes *Four Jews on Parnassus* (2008), a fictional dialog among Walter Benjamin, Theodor W. Adorno, Gerhard Scholem and Arnold Schönberg, exploring the process of canonization, Jewish identity and the characterization of Jews according to superficial criteria, as well as the relationships between the four men and their wives. Gehrke highlights the text's experimental structure as well as the integration of photo montages consisting of historical images and paintings by Paul Klee, created by artist and chemist Gabriele Seethaler.

Finally, Gehrke addresses Djerassi's motivation for writing fiction and non-fiction, acknowledging challenges in assessing authorial intent while simultaneously affirming the impact of Djerassi's scientific career on his literary works. She concludes that Djerassi's literary works transcend a mere cultural portrayal, successfully representing science as a ritualized tribal culture with clear norms while effectively conveying scientific knowledge through literary texts.

Eva Sabine Zehelein's *Science: Dramatic. Science Plays in America and Great Britain, 1990 – 2007* (2009) offers a comprehensive analysis of a selection of "science plays", prominently featuring Djerassi's plays *An Immaculate Misconception. Sex In An Age of Mechanical Reproduction* (1998) and *Oxygen* (2001). Zehelein investigates how these science plays represent central scientific themes while addressing critical issues related to scientific progress and its ethical implications. Situating her analysis within the Two Cultures debate, Zehelein examines the dynamic interplay of science and the humanities.

Zehelein regards Djerassi's plays not only as key contributions to the dramatic subgenre 'Science-in-Theater', but also uses this concept to classify plays that engage deeply with scientific subject matter and prioritize accurate scientific representation. She highlights the pivotal role of Djerassi's plays in establishing a framework for science plays successfully balancing scientific accuracy and dramatic entertainment. Zehelein proposes two subcategories within Science-in-Theater: 'Docere et Delectare'

plays, educating audiences on scientific topics, and the 'Tribal Culture' plays, characterizing the individual scientist and the tribal community of scientists – on "what makes them tick" (Zehelein 2009, 14). In both cases, the audiences are invited to venture into unfamiliar territory, bringing science closer to the people. According to Zehelein, the unique qualities of drama create a space for "a magical love affair with the natural sciences" (Zehelein 2009, 12), offering compelling ways to bridge the gap between the Two Cultures.

The Sci-Artist. Carl Djerassi's Science-in-Literature in Transatlantic and Interdisciplinary Contexts (2012), edited by Walter Grünzweig, presents criticism and commentaries to Djerassi's literary texts, emphasizing the unique fusion of science and literature in his oeuvre. This volume is based on an international, three-day symposium at TU Dortmund University in 2009, where Djerassi received his honorary doctorate for his literary achievements. The volume features contributions from scholars across diverse fields – including literary and cultural studies, natural sciences, Jewish studies, history, theater, art, and translation – highlighting the interdisciplinary nature of (engaging with) Djerassi's literary works. The volume focuses on several key aspects: Djerassi's two careers as scientist and writer, his role in bridging the 'Two Cultures', the theatrical adaptations of his Science-in-Theater plays, the representation of women's challenges in science within his literature, his Jewish heritage, and the significance of his poetry. By situating Djerassi's literary works within broader cultural and historical contexts, the volume emphasizes their ongoing relevance to contemporary discourse on science and society.

I have not included Walter Grünzweig's 2004 article, "Science-in-Fiction: Science as Tribal Culture in the Novels of Carl Djerassi", in my literature review, as I will examine it in greater detail in chapter 2, within the context of my analysis of Djerassi's tribal metaphor. The article is particularly valuable for its emphasis on the central role of gender in the representation of science in Djerassi's novels (and plays). The monographs by Gehrke, Zehelein, and Grünzweig, which analyze the cultural dimensions of the sciences, form the foundation of my research. While they recognize gender as a theme discussed in Djerassi's work, it is not recognized how gender permeates the culture of the sciences at every level and is *essential* to understanding the tribal culture of Djerassi's scientists. His oeuvre, my study claims, offers a critique of the comprehensive gender bias of the natural sciences.

2 Science as a Culture

A Masculine Tribe? Characterizing the Culture of the Sciences through Carl Djerassi's Tribal Metaphor

> We [scientists] proceed by common sense and ingenuity. There are no rules, only the principles of integrity and objectivity, with a complete rejection of all authority except that of fact.
>
> - Joel H. Hildebrand, chemist (1957)[7]

I am quite confident that Carl Djerassi would strongly disagree with this quote. To Djerassi, the widespread notion of the strict objectivity of scientists, driven by an excessive thirst for knowledge, has little to do with the realities he experienced in his own scientific career as a groundbreaking chemist. In his literary works, Djerassi scrutinizes the common (mis)conception of the scientist as an entirely fact-based, objective individual, detached from any (personal) factors possibly influencing the scientific endeavor.

Carl Djerassi argues that science is practiced amidst a distinct culture and that scientists – despite the fact that they act according to a shared code of conduct – are oftentimes unaware of the implications of this culture. On his mission to dissect and reveal what he considers the secrets of this rather exclusive culture of the sciences, Djerassi has repeatedly used tribalism as an analogy to refer to scientists as a social and cultural group. In the preface to *Stammesgeheimnisse* (2002), the telling title of the German edition of his first two novels, *Cantor's Dilemma* (1989) and *The Bourbaki Gambit* (1994), Djerassi points towards a central aspect of his understanding of the culture of science: He views scientists as "members of a tribal culture, whose idiosyncratic patterns of behavior are not only strange to the outside world but which are frequently not even recognized as such by their tribal members" (STG 7, translation DSS). As a "clansman" of the science tribe, as Djerassi, the former chemist, describes himself, it is his "personal belief [that] scientists operate within a tribal culture whose rules, mores

[7]Hildebrand, Joel H. 1957. "Science in the making." In: *Journal of Chemical Education* (1957), *34* (8), p. 414

and idiosyncrasies are generally not communicated through specific lectures or books, but through a form of intellectual osmosis via a mentor-disciple relationship" (Djerassi 2005).

Djerassi's portrayal of the sciences as a distinct tribal culture invites a closer examination of its cultural features, particularly its organization along gender-specific lines. I understand the tribal characteristics depicted in his literary works – competitiveness, legacy, territoriality – as expressions of *masculine* behavior. Consequently, it is essential to engage with the concepts of (hegemonic) masculinity and "manhood acts". This chapter explores key elements of Djerassi's depiction of the natural sciences as a tribe and analyzes the implications of his use of the tribal metaphor, with a specific focus on gender. I argue that Djerassi's science tribe is fundamentally masculine, and that the central characteristics of this tribal culture are inherently gendered.

Hegemonic masculinity

Anthropologist Matthew Gutmann defines masculinity as "anything that men think and do", "anything that men think and do to be men", and "anything that women are not" (Gutmann 1997, 386). Masculinity has to be understood in a relational context: masculinity and femininity – as counterparts – are not merely different things with the same value, "but reflect a gender system in which (masculine) men have higher status, more power, and greater privileges than women" (Berdahl et al. 2018, 425). Yet, masculinity is not understood solely in its relation to femininity – masculinity is also defined through the relations of men among each other. The manifestation of masculinity with the highest status, most power, and most privileges, is called *hegemonic masculinity*, a term coined by sociologist R.W. Connell. In her extensive study *Masculinities*, first published in 1993, with a second edition in 2005, Connell states that hegemonic masculinity refers to

> the cultural dynamic by which a group claims and sustains a leading position in social life. At any given time, one form of masculinity rather than others is culturally exalted. Hegemonic masculinity can be defined as the configuration of gender practice which embodies the currently accepted answer to the problem of the legitimacy of patriarchy, which guarantees (or is taken to guarantee) the dominant position of men and the subordination of women (Connell 2005, 77)

To Connell, the concept of masculinity is "inherently relational" (Connell 2005, 68): "'Masculinity', in the sense of a modern European/American understanding, exists in

contrast to 'femininity'" (cf. ibid.). The binary opposition between masculinity and femininity – though frequently criticized – nonetheless represents a dominant, patriarchal understanding of gender.

The gender binary within patriarchal ideology often relies on the notion that rationality is masculine while emotion is feminine – an aspect that has historically played a significant role in the exclusion of women from science. Connell explains:

> Science and technology, seen by the dominant ideology as the motors of progress, are culturally defined as a *masculine realm*. Hegemonic masculinity establishes its hegemony partly by its claim to embody the power of reason, and thus represent the interests of the whole society. (Connell 2005, 164, emphasis mine).

Clearly, understanding the natural sciences as a culture requires consideration of gender, with a specific focus on masculinity. As Connell argues, gender does not merely influence the behavior of men and women in science – it shapes and defines science as an institution: "Institutions are substantively, not just metaphorically, gendered." (Connell 2005, 73). In science – the supposed pinnacle of rationality and reason – masculinity substantially impacts its cultural norms, values, and practices.

Manhood acts

As Gutmann's definitions of masculinity suggest, hegemonic masculinity has a *performative* dimension: It is enacted – both collectively and individually – through specific behaviors. Sociologist Michael Schwalbe refers to these as "manhood acts", defined as "claims to membership in the privileged gender category 'men'" (Schwalbe 2018, 59). He furthermore describes them as "interactional rituals that produce the cultural objects we call 'men'" (Schwalbe 2018, 56). A prominent example of such acts is dominance behavior, in which an individual asserts superiority over others or seeks to control them. Yet, masculinity is not merely "acts of individual self-presentation", as Schwalbe explains:

> The practices whereby males claim manhood status can include collective acts of valorizing males, men, and masculinity; of devaluing females, women, and femininity; of excluding women from networks, jobs, and positions of power; and of coordinating acts of domination in war, business, and politics. To engage in these sorts of practices, thereby upholding relations of domination and subordination, is what it means to enact a form of masculinity […]. (Schwalbe 2018, 31)

Culture supplies these manhood acts to its members, who are then compelled to reproduce them in order to be recognized as 'men' (cf. Schwalbe 2018, 56).

Sociologist Pierre Bourdieu argues that the male habitus is constructed and enacted within the space in which men engage in, what he calls, "serious games of competition" (Meuser 2007, 38). In these settings, women are assigned the role of spectators and thus serve as looking glasses for men – referencing Virginia Woolf's famous metaphor – reflecting the power and influence of men (cf. Meuser 2008, 34). According to sociologist Michael Meuser, beyond the competitive quality of masculinity, Bourdieu highlights another central aspect: the homosocial character of the spaces where men compete. Paradoxically, competition serves as a means of collectivization among men (cf. ibid.). Men engage in these "serious games of competition" across all areas of life governed by patriarchal principles: economy, politics, science, religious institutions, military, and more. (cf. Meuser 2008, 33). Before examining how the members of Djerassi's science tribe conform to these cultural norms – and more specifically, how manifestations of hegemonic masculinity govern the natural sciences in his literary works – it is essential to first explore the definition and application of the tribal metaphor.

Tribe: Definitions and political correctness

The use of the tribal metaphor has proven to be popular in a multitude of contexts, drawing on it with differing foci: some alluding to the exclusivity of a specific social group, others drawing upon the notion of a closed community. Overall, the use of the tribal metaphor seems widespread, and yet – as it is always the case for metaphors – ambiguous and vague.

The Cambridge Dictionary defines the term 'tribe' as "a group of people, often of related families, who live together, sharing the same language, culture, and history, especially those who do not live in towns or cities" ("Tribe"). In this rather simplistic definition, the term 'tribe' might trigger associations to social groups living in villages outside of westernized civilizations. In the context of Djerassi's anthropological approach to characterizing the culture of science, this comparison might appear unsuitable – what do tribal communities have in common with scientists in laboratories? The term 'tribalism', as used in politics for instance, sheds light on this apparent discrepancy: the dictionary defines it as "a very strong feeling of loyalty to a political or social group, so that you support them whatever they do" ('tribalism', id.).

In anthropology, the study of tribes has played a role for centuries, yet has become a taboo in recent decades. In their extensive study *Islam in Tribal Societies. From the Atlas to the Indus* (1984) Ahmed S. Akbar and David Hart define tribes as

> rural groups that have a name and distinguish between members and non-members, which occupy a territory, and which within that territory assume either all responsibility, or at least a significant proportion of the responsibility, for the maintenance of order. (Ahmed and Hart 1984, 1)

This broad definition offers a starting point for defining the term 'tribe', where the primary feature distinguishing a tribe from other social groups is the significance of territoriality. However, the controversy surrounding the term quickly becomes apparent in research. Ahmed and Hart observe that "the definition of 'tribe' remains problematic" and that to some, attempts to define the concept may even provoke "a crisis involving merely a concept or the empirical foundations of anthropology itself" (ibid.).

In his 1975 monograph *The Notion of Tribe*, US-American anthropologist Morton H. Fried provides one of the very rare detailed studies of tribal cultures in the past century[8]. Referring to the controversy evolving around the use of the term 'tribe', Fried argues its meaning is "taken for granted but cannot withstand close scrutiny without fragmenting into contradictory packets of significance or dissolving in vagueness" (Fried 1975, 1). As it lacks a rigorous definition in both anthropology and the general lexicon (ibid.), the use of the term is commonly troubled by ambiguity. Nonetheless, Fried remarks that in fact, there are a number of populations applying the term to themselves "explicitly using the word to designate an inclusive membership group with certain rights and privileges" (Fried 1975, 73).

Apart from the lack of a clear definition, the term 'tribe' carries the heritage of being used as a pejorative term. Historically, it is unclear when its derogatory use emerged. Fried, in *The New Century Dictionary and Cyclopedia*, published in 1911, defines the term as referring to "a primary aggregate of people in a primitive or barbarous condition" (Fried 1975, 7), or "a local division of a primitive or barbarous people" (ibid.), leading to the conclusion that "'tribe' and its associated linguistic forms may be understood as dirty words no matter the intention of the speaker" (Fried 1975, 8). As a result, the term has become a taboo in anthropology.

[8] Fried explores the notion of tribe from various different angles, including tribes as, *inter alia*, linguistic groupings, economic systems, ideological groups, and war/peace units. For more detail, see Fried 1975.

In his article "A Relook at the Term 'Tribe'", Indian social scientist Saqib Khan alludes to the problematic heritage of the concept of 'tribe' due to its undifferentiated use by colonizers:

> Colonial anthropology, and the anthropological and social literature from the 1920s and 1930s onwards 'froze' the notion of tribe in time and space on account of certain features; tribe was also seen as a homogenous and undifferentiated category. (Khan 2016, 82).

While his criticism of tribal studies focuses on research of Indian tribes, his main arguments can nonetheless be applied to the general use of the term 'tribe': the common perception of 'tribe' today is rooted in a colonial (and, I would add, eurocentric) perspective on tribes, one that has become widely contested (cf. ibid.). Given the assumption of colonial anthropology and early studies of tribes as entities "inherently distinct from other social categories/groups" (ibid.), the western view on tribes focused on aspects of otherness and exoticness, or in more negative terms, primitiveness and "backwardness" (Khan 2016, 83). The ignorance of colonial anthropology resulted in a perception of tribes as "an unchanging, unstructured and homogenous category" and hereby "ignor[ing] differentiation among tribes and legitimised a tribe as one with distinct social and cultural identity" (ibid.). In other words, the western, eurocentric understanding of 'tribe' is characterized by a lack of acknowledgement of the variety and diversity of tribes.

As Americanist Walter Grünzweig points out, the terms 'tribe', 'tribal', or 'tribalism' cannot be found as main entries in Routledge's *Encyclopedia of Social and Cultural Anthropology* (cf. Grünzweig 2004, 312). Only in the encyclopedia's glossary does one discover a short paragraph proclaiming that

> [t]he terms 'tribe' and 'tribal' […] have a variety of meanings, some of which are taboo in modern anthropology. The accepted usage of 'tribe' is as a political unit larger than a clan and smaller than a nation or people, especially when indigenous populations themselves use the term. […] The use of 'tribal' to refer to aspects of culture other than politics is generally discouraged in contemporary anthropology […]. (Grünzweig 2004, 789)

The taboo of using the term 'tribe' for anything but specific social groups in indigenous populations is mainly caused by the implied or explicit social hierarchy connected to the term: while some social groups are considered more advanced, sophisticated, and consequently more powerful and superior in the global hierarchy, the tribe as a social group is viewed as primitive and underdeveloped and therefore holds a low position. In this context, Grünzweig points towards the core of the problem: "Such a value judgment is a result of our white, male, eurocentric, and in any case self-proclaimed

position of superiority which must be abolished both for reasons of scientific objectivity – and political correctness" (Grünzweig 2004, 312).

In general, the heightened reflexivity in describing social groups and social relations has increased awareness of this potentially discriminatory use of terminology and sparked an on-going debate about the legitimacy of various terms. Political scientist Paul James claims that in academia, the use of contested terms, such as 'tribe', becomes so problematic that "scholars are increasingly shying away from using these concepts" (James 2006, 20). Simultaneously, James points out that "contemporary intellectuals often completely misunderstand the complexities of actual tribalism" (id. 30). Despite its problematic heritage, the tribal metaphor continues to be used extensively, particularly in a metaphorical sense. Lawrence Rosen, professor of anthropology at Princeton University, highlights how in politics, for example, the term 'tribal' has been employed to "capture how Western, and especially American, political life has regressed in recent years into a more primitive state, one characterized by polarization, insularity, vengefulness, and lack of compromise" (Rosen 2018, 49). This usage reflects a "mistaken view of tribes as primitive, violent, and insular" (id. 50). Overall, it is evident that contemporary applications of the tribal metaphor draw on an outdated anthropological understanding of tribes.

In less academic contexts, the term 'tribe' has entered the (everyday) language of many English-speakers. For example, in the ABC legal drama *For Life* (2020), the protagonist Aaron Wallace refers to the different social groups of inmates at Bellmore correctional facility as 'tribes'. On social media platforms like *Instagram*, so-called 'mom influencers' use the term to describe their nuclear families with four or more children as their 'tribe'. The metaphor appears even in accounting: Rachel Baskerville, professor of accounting, provides a detailed analysis of the tribal metaphor within corporate organizations (cf. Baskerville 2009).

Metaphors are inherently ambiguous: according to George Lakoff and Mark Johnson's Conceptual Metaphor Theory, specific characteristics are mapped from the source domain – the tribe – onto the target domain, that is, the social group it characterizes (cf. Lakoff & Johnson 1980, 253). Without offering an exhaustive linguistic analysis of these instances, it is nonetheless possible to observe that users of the tribal metaphor map different characteristics onto the social groups in question. In the prison context, the metaphor seems to evoke distinct, closed social groups within the correctional facility. By contrast, Instagram influencers appear to emphasize the large number of individuals forming a close-knit community with a shared collective

identity. Similarly, Baskerville's use of the tribal metaphor highlights the notion of community, focusing particularly on a shared code of conduct.

How, then, does Djerassi's use of the tribal metaphor for his scientists fit into this broader discussion? While the aim of my reflection on the term is not to argue for or against its usage – after all, Djerassi employs it – it remains important to acknowledge both the potential issues surrounding the term and its literary and metaphorical potential. Clearly, Djerassi does not equate scientists with specific tribes. Rather, he compares them to the western concept of (so-called) primitive tribes – ironically, a concept produced by scientists themselves. In this context, the more pertinent question becomes: In what ways do Djerassi's scientists reflect (western notions of) tribal societies? And what are the implications of employing the tribal metaphor? As a next step, then, it is essential to examine the tribal characteristics of science as portrayed in Djerassi's literary works.

Understanding Djerassi's tribal metaphor

As noted earlier, Ahmed and Hart define a tribe as a social group that distinguishes between members and non-members and occupies a specific territory. Applying this basic definition to Djerassi's scientists appears both logical and appropriate – yet, the metaphor extends further. In his contribution to *The Holodeck in the Garden. Science and Technology in Contemporary American Fiction* (2004), Walter Grünzweig investigates Djerassi's characterization of the culture of the sciences through qualities commonly associated with tribal cultures. Drawing on anthropological studies of African and Australian cultures (cf. Grünzweig 2004, 313), he identifies several recurrent tribal characteristics in the culture of Djerassi's scientists: territoriality, competition and priority, trust, lineage, and gender. While I agree with this assessment, I argue it requires to be adapted: In my view, gender functions as the overarching framework that determines all other distinguishing features of scientific culture. In the following, I will analyze the tribal characteristics outlined by Grünzweig and demonstrate how each is inherently gendered.

First and foremost, territoriality plays a central role in understanding Djerassi's scientists as a tribe: Grünzweig argues that "[l]oyalty is clearly owed […] to one's territorially defined tribe" (Grünzweig 2004, 314). The territory of a scientific tribe is usually the institution at which a member conducts her or his research. Changing institutions, for instance joining another university, is considered "treason and lack of

solidarity" (ibid.). Of course, territoriality in the culture of Djerassi's scientists should not be understood solely in spatial terms: the research field itself also demarcates the territory of a specific tribe and "defines tribal limits", particularly in relation to disciplinary and interdisciplinary contexts (Grünzweig 2004, 315). Within this framework, the limitations of the tribal metaphor become apparent. According to Grünzweig, the science tribe can be understood as one singular tribe, sharing common beliefs, values, and traditions, or as different, competing tribes consisting of members from different scientific disciplines. Rather than insisting on anthropological consistency, Grünzweig advocates for a more flexible and expansive interpretation of the tribal metaphor (cf. Grünzweig 2004, 314).

For social scientist and geographer Doreen Massey, territoriality is a distinctly gendered concept: "[…] the need for the security of boundaries, the requirements for such a defensive and counter-positional definition of identity, is culturally masculine" (Massey 1994, 7). Accordingly, the tribal behavior of Djerassi's scientists in 'marking their territory' must be understood as an expression of masculinity. In this context, territoriality goes beyond merely asserting authority or responsibility – it also reflects broader manifestations of masculinity, such as domination, aggression, and self-centeredness. In practice, territoriality in science significantly impacts the reality of women in science, often taking the form of "territorial segregation", as science historian Londa Schiebinger observes (Schiebinger 1999, 34). According to her, women tend to cluster in specific scientific disciplines "because they feel comfortable there and are able to become leaders" (Schiebinger 1999, 35).

Against this background, brutal competitiveness emerges as a defining feature of Djerassi's science tribe. Driven by the striving for priority – being the first to make a discovery – Djerassi portrays his scientists as extremely ambitious. He underscores this trait by highlighting a peculiarity within his science tribe: "Why do the scientific Olympics only reward gold medals and no silver or bronzes?" (Djerassi 2005). In this depiction, the scientific process itself is rendered almost irrelevant. What matters is winning the competition of establishing priority – typically through publication. In other words, in Djerassi' science tribe, being first is all that counts, as "being second might as well be last" (ibid.).

Notably, Djerassi's use of a sports metaphor draws a parallel to another highly competitive domain. By referencing the Olympics – the pinnacle of athletic achievement – he highlights the irony at the heart of scientific culture. Even in sports, recognition is extended to second and third place. Yet, in the world of Djerassi's scientists, such acknowledgment is unthinkable. Scientific success and personal

reputation take absolute precedence, often leading to extreme consequences, as my analysis of Djerassi's literary representations of science will explore in detail.

This raises the question: in which ways is competitiveness itself a gendered concept? In sociology, competition is often understood as stereotypically *masculine* behavior, as it is based on (and reproduces) stereotypically masculine traits, such as dominant behavior. Sociologist Jennifer Berdahl and her colleagues call this manifestation of masculine competitiveness 'Masculine Contest Culture' (MCC), which refers to "how the very acts that serve to signify an individual man's masculinity can come to define an organization's culture" (Berdahl et al. 2018, 430). Berdahl et al. investigate competition as typically masculine behavior at different workplaces and have reached the conclusion that "men compete at work for dominance by showing no weakness, demonstrating a single-minded focus on professional success, displaying physical endurance and strength, and engaging in cut-throat competition" (ibid.).

A key insight from Berdahl and her colleagues is that it is not the nature of the work itself that shapes workplace culture and forces individuals to conform to certain norms in order to be successful. Rather, they argue the opposite: the men performing the work shape the culture of the workplace for everyone involved – often in negative ways. Berdahl et al. argue that in MCC "much of what simply appears to be neutral practices and what it takes to get ahead at work is actually counterproductive behavior aimed at proving manhood on the job" (Berdahl et al. 2018, 423). This code of conduct applies to all employees, regardless of gender. Moreover, MCC is strongly shaped by race, with white hegemonic masculinity dominating these environments (cf. Berdahl et al. 2018, 431). The negative effects of MCC are far-reaching: according to Berdahl et al., organizations with MCC display "dysfunctional organizational climates (e.g. rife with toxic leadership, bullying, harassment) associated with poor individual outcomes for men as well as women (e.g. burnout, low organizational dedication, lower well-being)" (Berdahl et al. 2018, 422).

Applying the theory of Masculinity Contest Culture to Djerassi's science tribe appears reasonable in this context: his scientists are a group of (predominantly) highly competitive men whose desire to prove their manhood manifests itself through acts of masculine dominance behavior. Thereby, the male scientists establish the norms and practices that govern the scientific community as a whole, regardless of gender. In my subsequent analysis, I will show how Djerassi's male scientists shape the culture of science in precisely this way.

A highly competitive culture like that of Djerassi's science tribe results in a lack of trust between rival scientists. Given the intense pressure to establish priority, trust is something Djerassi's scientists can barely afford. However, trust is highly important for the success of a research team, which Grünzweig identifies as "[a] prerequisite for a smooth functioning of the tribal life" (id. 318). Consequently, if trust is damaged or destroyed, the research team is unable to function, threatening their scientific project: "In order for scientists to succeed, they must be able to trust each other's results and research methods" (ibid.). Repeatedly, as the subsequent analysis of Djerassi's literary works will show, the scientists' striving for priority, fame, and recognition by their peers threatens collegial trust.

In portraying the recruiting of new members, Djerassi presents lineage as another central aspect of the sciences as a tribal culture. A scientist's academic origin – particularly their institutional affiliation and connection to a scientific mentor, are aspects that repeatedly arise in Djerassi's literary works. In this regard, as Grünzweig observes, the taboo of inbreeding holds particular significance in this context: just as incest is prohibited in smaller units, such as the family, academic inbreeding in Djerassi's science tribe is considered unacceptable as well (Grünzweig 2004, 315). Instead, switching institutions from time to time enables Djerassi's scientists to secure a productive research environment and establish a large scientific network for themselves.

Djerassi's science tribe is portrayed as a patriarchal system in which new members of the scientific tribe choose their scientifically established, experienced, and – more often than not – *male* mentor to guide them through the world of science with its distinct code of conduct. The mentor-mentee relationship, described as an "intellectual osmosis" (Djerassi 2005), is regarded as central for professional success in the sciences. Without this alliance, it appears considerably more difficult, maybe even impossible for new scientists in Djerassi's science tribe to successfully navigate through the highly competitive field of science.

In sociology and anthropology, lineage has been extensively studied in the context of gender, with a predominant focus on patriliny – tracing descent through the male line within a family. Anthropologists Diane E. King and Linda Stone have developed a concept of cultural reproduction called "lineal masculinity" which they define as

> an ontological essence that flows exclusively to and through men over the generations. Individual men receive a communal masculinity from their male ascendants; through their own behavior and their achievements, or lack thereof, they may enhance or detract from this masculine quality as they pass it to the next generation. Lineal masculinity is

> expressed and performed somewhat differently in various cultural settings. (King and Stone 2010, 333)

Historically, patriliny has been prevalent across many cultures worldwide. In fact, only a few groups – such as Jews and the Tuareg – are considered non-patrilineal (cf. King and Stone 2010, 324). The concept of lineal masculinity emphasizes that "a patriline is not only a line of fathers and sons through time but it is also a 'mascu-line' that enhances and gives form to masculinity" (King and Stone 2010, 327). Lineage, therefore, emerges as a deeply gendered concept. Within patrilineal systems, male members of a group (re)produce cultural values and norms, and they are seen as possessing the power to transmit certain identity categories – what King and Stone term a "social ontology" (King and Stone 2010, 330) – to their offspring, including family, tribal, religious, ethnic, or other group affiliations. Beyond its gendered dimensions, lineage also underscores the performative nature of masculinity: it is enacted and made visible through cultural practices and rituals. In patrilineal societies, as Monica Das Gupta et al. assert, "only men constitute and reproduce the social order … the significant social reproduction is that by the father of the son" (qtd. in King and Stone 2010, 325).

In Djerassi's science tribe, women face particular difficulties in gaining entry. Drawing on this notion, Grünzweig argues that, much like in traditional tribal societies, "it is possible to join tribes, but the requirements for acceptance are often complex and intense" (Grünzweig 2004, 316). For Djerassi's women in science, this means that they can only "become members of the tribe on its terms" (ibid.). These aggravated circumstances for women in science highlight a defining feature of Djerassi's tribal culture of science: its structuring according to gender criteria. Djerassi's science tribe is a masculine space, an 'old boys' network', in which experienced male scientists define and reproduce the shared code of conduct – one that is deeply gendered – which, under the guise of rationality and objectivity, systematically excludes women from full participation in science.

The effects of using the tribal metaphor for Djerassi's scientists

The anthropological perspective on the sciences as a tribal culture disputes the common notion of the sciences as rational and objective: as Grünzweig argues, the culture of the sciences "is rendered as relative, preliminary, ritualistic" and through its tribal quality "dissolves the false dichotomy of culture and (natural) science by

showing the latter's *own* cultural quality" (id. 319). Consequently, Djerassi's tribal metaphor creates a realm of dialog for the allegedly contrary poles of the sciences and the humanities by emphasizing the relativity of the sciences as a culture, unlike C. P. Snows Two Cultures, "which remain strangely separate and isolated from each other and whose breach can only be bridged by knowledge" (id. 320).

Of course, Djerassi's tribal metaphor does not serve as an anthropological analysis of the culture of science. Similar to Grünzweig who calls it a "*fictional* cultural anthropology" (Grünzweig 2004, 311, emphasis mine), Eva-Sabine Zehelein argues that the tribal metaphor "should not be misunderstood as an anthropological take on the scientific community" (Zehelein 2009, 134). To her, "the term signifies […] the depiction of those mechanisms operating within a specific community which not only distinguish it from other social groups, but which are also often incomprehensible or plain invisible for outside observers" (ibid.). Rather than engaging with the tribal metaphor in its full complexity, Zehelein employs it primarily to highlight the perceived exoticness of Djerassi's scientists from an outsider's perspective.

While I agree with Zehelein's interpretation, I propose an expanded understanding of the tribal metaphor: I argue that Djerassi uses it not only to highlight the exoticism of his scientists but also to expose their unsubstantiated overconfidence and hubris. Despite the fact that they are presented as an extremely intelligent, skilled, and highly evolved social group, they appear – paradoxically – remarkably limited in their abilities to reflect on the predominant code of conduct within the sciences, especially regarding the lack of gender equality in the sciences. As my analysis of his literary works will demonstrate, Djerassi's scientists are not even aware of the relativity of their realities – in this regard, they are, in fact, primitive and naïve. The tribal metaphor, then, becomes a powerful tool for underscoring this paradox.

To put it bluntly, Djerassi portrays his scientists as exceptionally smart individuals behaving like idiots. The German language provides a fantastic term, *Fachidioten* (literally: specialized idiots), which perfectly captures what Djerassi points towards here – and which the English language notably lacks an exact equivalent. A *Fachidiot* is an individual who is brilliant in her or his field of specialization but demonstrates a striking lack of knowledge – up to the point of willful ignorance – beyond it. Moreover, it suggests the failure to situate their area of specialization within a broader intellectual or social context. By invoking the tribal metaphor to highlight the 'idiocy' of his (male) scientists, Djerassi implicitly draws upon pejorative, western notions of tribal cultures as primitive and unreflective.

Of course, Djerassi's own affiliation with the science tribe cannot be overlooked in this context. As a member of the very tribe he critically examines in his literary works, his critique has to be understood in its postmodern irony. In a tongue-in-cheek manner, Djerassi besmirches his own lab coat in order to uncover the cultural idiosyncrasies of the culture of the sciences and through this, strongly opposes the objectivity fetish of the fellow members of his tribe. Djerassi's criticism is directed at the paradoxical behavior of scientists, especially their lack of awareness of their, at times, absurd code of conduct, and not at tribal cultures themselves. Thus, his use of the tribal metaphor does not refer to mere anthropological contexts but functions as a metaphor for the exclusive culture of the sciences.

While Grünzweig, among others, has demonstrated that tribal characteristics such as territoriality, competitiveness, lineage, and trust can effectively describe the culture of science in Djerassi's literature, certain aspects of the tribal metaphor may appear problematic from an anthropological standpoint. However, the issue here is not whether partial anthropological inconsistency or concerns over political correctness invalidate the metaphor – Djerassi clearly and deliberately uses it. To fully grasp its function in his literary works, it is necessary to approach the metaphor in a broader sense. As I have shown, the metaphor is *fictionally* useful.

Exploring the tribal characteristics of Djerassi's scientists is essential to his oeuvre, yet understanding the sciences as a culture of its own is by no means new. The cultural dimension of the sciences has been discussed in the context of the so-called 'Two Cultures' dichotomy – the (allegedly) sharp division of the sciences and the humanities – for a long time. In her monograph *Science: Dramatic. Science Plays in America and Great Britain, 1990 – 2007* (2009), Eva Sabine Zehelein claims that "[e]very scholar who dares to delve into the vast and turbulent ocean broadly framed by the continents 'science' and 'the arts/'the humanities'", has to "take a brief sojourn at Sir Charles Percy Snow's (in)famous 1959 Rede Lecture on the Two Cultures" (Zehelein 2009, 21). Obviously, when investigating Djerassi's literary portrayal of the culture of the natural sciences, one can also not neglect the Two Cultures dichotomy.

Natural Sciences versus Humanities? Exploring C. P. Snow's Two Cultures Dichotomy

Take the chemists.
By definition
Synthesizers of molecules;
Dissectors of molecules;
Manipulators of molecules.

For *molecules* read *words*
You have defined the poet.

- Carl Djerassi, *Tagebuch des Grolls. A Diary of Pique, 1983-1984* (2012)

Although Snow delivered his famous lecture over 60 years ago, the concept of the Two Cultures remains highly influential in contemporary discussions about the relationship between the natural sciences and the humanities[9]. In short, the Two Cultures argument by Snow points to an alleged separation of "the intellectual life of the whole of western society […] into two polar groups", namely the humanities and the natural sciences (Snow 2013, 3). While Snow explicitly refers to only "the literary intellectuals" (Snow 2013, 4), many critics, including Ingrid Gehrke, claim that Snow's criticism can be read as an attack on the entirety of the humanities (cf. Gehrke 2008, 133). For Snow, the "two poles" amount to a division equal to "a gulf of mutual incomprehension – sometimes […] hostility and dislike, but most of all lack of understanding" and attributes this situation to different attitudes, "even on the level of emotion" (Snow 2013, 4).

Snow considers the alleged animosity and distance between the sciences and the humanities to be one of the most significant challenges of the 20th century, declaring the attempt to overcome the division of the Two Cultures an opportunity to implement fundamental change (cf. Snow 2013, 50). Snow argues that "[t]here seems to be no place where the cultures meet" in order to "produce creative changes" (Snow 2013, 16) – he views the educational system as the only opportunity to overcome the alleged ignorance between the Two Cultures (cf. Snow 2013, 18). It is particularly the US-American educational system in which Snow sees great potential: Contrary to the highly specialized British curriculum, the US-American system of college education, the liberal arts, supposedly aims at imparting a more general knowledge (cf. Snow 2013, 18 f.).

[9] For a detailed analysis of the Two Cultures debate in its historical context, see Jakobs 2006.

Snow frames the Two Cultures as binary oppositions, with clear-cut boundaries, behaving contrarily to one another. However, he overlooks internal diversity of the disciplines as he treats the Two Cultures as two homogeneous entities. For instance, he attests scientists the generic characteristic that "naturally they had the future in their bones" (Snow 2013, 10). While Snow does admit that "[a]ttempts to divide anything into two ought to be regarded with much suspicion", he nevertheless opts for the concept of the Two Cultures because he views it to be "a dashing metaphor" to point to the cultural differences between the sciences and the humanities (Snow 2013, 9).

Although Snow's broad concept of the Two Cultures has certain weaknesses, it has a notable strength: he acknowledges that "the scientific culture really is a *culture*, not only in an intellectual but also in an *anthropological* sense", highlighting its "common attitudes, common standards and patterns of behaviour, common approaches and assumptions" (Snow 2013, 9, emphasis mine). To Snow, culture encompasses two dimensions: the intellectual – the skills and abilities of a particular group – and the anthropological, which involves the shared values, beliefs, and behavioral patterns of a social group.

Like Djerassi, Snow highlights scientists' profound unawareness of their culturally implicit behaviors: "Without thinking about it, they respond alike. That is what a culture means" (Snow 2013, 10). Although Snow's argument regarding the intellectual aspect of culture may seem one-dimensional, his anthropological perspective on scientific culture is more compelling. His view resonates with Djerassi's central claim that science, contrary to popular belief, operates within a distinct (tribal) culture whose members are largely unaware of their culturally determined behavior. However, their motivations for framing science as a distinct culture differ. As noted earlier, Djerassi seeks to expose the hidden norms and values of the scientific culture in order to critically question them. In contrast, Snow's purpose in defining the sciences as a separate culture is to strengthening their status in the wake of the scientific revolution (cf. Kühn 2002, 63).

Though certainly not new – it follows the famous lectures "Science in Culture" by British scientist Thomas H. Huxley in 1880 and "Literature and Science" by British cultural critic Matthew Arnold in 1882 – C. P. Snow's Two Cultures argument sparked heated debates about its adequacy.[10] Probably the most well-known dispute in this

[10] Eva-Sabine Zehelein, Thomas Kühn, and especially Silke Jakobs provide a detailed analysis of the historical context of the debate, which – while very worthwhile to read – I will not include due to lack of relevance for my thesis. It should suffice to point out that Snow's argument seems to have been highly

context arose between Snow and literary critic Frank Raymond Leavis, sparked by Leavis' lecture at Cambridge University, later published as an article in *The Spectator* in 1962. Leavis' response to Snow's Rede Lecture was clearly motivated by a personal feud between the two men. Leavis deconstructs more or less each of Snow's arguments, pulling his lecture to pieces on both factual as well as personal levels, famously describing Snow as "intellectually as undistinguished as it is possible to be" (Snow 2013, 54) and accusing him of being unaware of his own ignorance (cf. Snow 2013, 55).

Leavis has been widely criticized for his article: In his foreword to Leavis' critique of Snow's Two Cultures lecture, literary studies professor Stefan Collini calls it "a byword for excess – too personal, too dismissive, too rude, too Leavis" (Leavis 2013, 1). Collini views Leavis' response as

> a […] pertinent illustration both of the obstacles faced by the critic who understands himself to be challenging a set of attitudes that are so widely shared and so deeply rooted as to seem to most members of that society to be self-evident truths (Snow 2013, 2).[11]

Collini highlights the lack of self-reflexivity in the Two Cultures debate, noting that Snow's alleged generalizations mirror the preconceptions of the general public. Beyond this, the Snow versus Leavis controversy – along with many interfering voices – reveals just how emotionally charged the discourse around the Two Cultures has been.

Over the past decades, the idea of a sharp division between the sciences and the humanities has never truly disappeared. While some dismiss the debate as outdated (wittily referred to in German as "*Snow von gestern*"[12]), the perceived dichotomy between science and literature continues to play a significant role in society. This tension persists across various contexts – academic, educational, and even popular culture – where ongoing discussions focus on how to bridge these supposed counterparts. Few scientists have critically examined their own scientific culture – among them is Polish-American theoretical chemist and Nobel laureate Roald Hoffmann, co-author of Djerassi's science-in-theatre play *Oxygen* (2001). In a personal account about his dual roles as scientist and poet, he describes a "unity of creative work in science and in the humanities and the arts" since "both involve acts of creation, accomplished through craftsmanship, with an attention to detail" (Hoffmann 1988,

motivated by personal factors, most prominently his lack of success in the field of science (cf. Zehelein 2009, 24 f.). For more detail see Kühn 2002, Jakobs 2006, and Zehelein 2009.

[11] For a more detailed account of the Snow vs. Leavis dispute, see Collini's introduction in Leavis, pp. 5 – 49 as well as Zehelein 2009, pp. 21 – 27.

[12] Lepenies, "Der Snow von gestern", *Die Zeit*, 17.6.1994, 43.

10). Yet, according to him, there are "forces counteracting that unity" (ibid.), particularly scientific reductionism, which he sees as threat to the unity of science, humanities, and the arts. According to Hoffmann, the vertical notion of knowledge narrows one's worldview and fosters a separation between the sciences and the humanities (cf. Hoffmann 1997, 20 f.)

As literary studies scholar Silke Jakobs points out in her monograph *Selbst wenn ich Schiller sein könnte, wäre ich lieber Einstein. Naturwissenschaftler und ihre Wahrnehmungen der 'Zwei Kulturen'* (2006), Hoffmann engages with the *Erklären vs. Verstehen* controversy. German historian Johann Gustav Droysen (1808 – 1884) and German philosopher Wilhelm Dilthey (1833 – 1911) introduced this terminological distinction to differentiate the natural sciences (*Erklären* – to explain) from the humanities (*Verstehen* – to understand). Hoffmann criticizes the natural sciences' uncritical emphasis on *Erklären*, arguing that the divide between the sciences and the humanities would be unnecessary if the sciences allowed differing perspectives, instead of solely seeking 'the one solution' (cf. Jakobs 2006, 71).

The persistent lack of communication between the two disciplines is often seen as a significant obstacle in the relationship between the sciences and the humanities. To Snow, the Two Cultures not only lack common ground, they are also unproductive in their differences:

> But they are there, as it were, in a vacuum, because those in the Two Cultures can't talk to each other. It is bizarre how very little of twentieth-century science has been assimilated into twentieth-century art. Now and then one used to find poets conscientiously using scientific expressions, and getting them wrong. (Snow 2013, 16)

This is where Djerassi's literature becomes particularly relevant. His literary works reflect key aspects of Snow's lecture, particularly Snow's understanding of the sciences as a distinct culture with specific cultural norms and practices. Building on this concept, Djerassi not only embraces but further develops it. As Matthias Kleiner, former president of the *Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz e.V.*, and of the *Deutsche Forschungsgemeinschaft* (DFG) notes, Djerassi's literary works provide a new perspective on Snow's argument of the Two Cultures:

> Through his fictional analyses of scientific discourses, Djerassi has overcome the binary opposition of the Two Cultures by C. P. Snow and created a new basis of exchange between these two variants of appropriation and interpretation of the world. (Kleiner 2012, 6, translation DSS)

As I will examine in my subsequent analysis of Djerassi's literary works, Djerassi does not simply integrate Snow's approach of an alleged dichotomy of the Two Cultures

into fictional worlds. While he does highlight the contrasts between the sciences and the humanities, his endeavor goes beyond reinforcing this binary opposition. Much like in the poem quoted at the beginning of this chapter, Djerassi seeks to foster a new, productive interdisciplinary dialog between the allegedly incompatible disciplines of the sciences and the humanities by addressing issues where both disciplines meet and intertwine. As I will argue in the following chapter, gender is not merely a thematic concern but a driving force, serving as the central element of the (tribal) culture of the sciences and shaping the interdisciplinary nature of Djerassi's oeuvre.

3 The Significance of Gender in Djerassi's Science-in-Literature

Let the Women Show Them How It's Done! – Gender in Carl Djerassi's First Science-in-Fiction Novel *Cantor's Dilemma* (1989)

How does scientific research work? How does a scientist develop and publish a groundbreaking theory? What happens behind closed doors in science? And ultimately, what is it like to be a woman in science? With its intriguing tale about the scientific establishment, *Cantor's Dilemma* promises to answer these questions and provide an insight into the exclusive world of academia and science. Yet, as a representative of the sub-genre of the campus novel (or *Universitätsroman*), it goes beyond mere voyeurism and entertainment: The novel deconstructs the (self-)perception of academia as the crown of human excellence, highlighting the at times absurd codes of conduct within the academic culture. In the novel, the vast majority of the scientists lack self-reflexivity and are portrayed as unaware of the cultural foundations and implications of their own academic discipline.

In Djerassi's first Science-in-Fiction novel, published in 1989, Isidore Cantor, a cell biologist at a large Midwestern university, develops a groundbreaking theory in cancer research, which makes him a promising candidate for the Nobel Prize of Medicine. Together with Jeremiah Stafford, his mentee and highly ambitious research fellow who performs the experiment, Cantor publishes their findings in *Nature* magazine and they receive great recognition for their breakthrough within the scientific community for their breakthrough. When Harvard professor and Cantor's own mentor Kurt Krauss informs Cantor that his experiment could not be successfully replicated, Cantor and Stafford attempt to repeat it themselves – successfully, it seems at first. In the following year, Cantor and Stafford learn that they will receive the Nobel Prize for their discovery, the 'gold medal in the scientific Olympics'. Driven by his bad conscience and his fear of exposure, Stafford confesses to Cantor that he manipulated their last experiment and offers to reject the Nobel Prize. Surprisingly, Cantor asks Stafford to keep this a secret and accept the Nobel nonetheless. He then reveals to Stafford that he has successfully repeated the experiment himself, without his assistant's involvement.

The novel portrays the culture of the sciences as arbitrary and bound to conventions, suggesting that science is not as objective as it claims to be. It builds on the Two Cultures dichotomy – natural sciences versus the humanities – while

introducing gender as an additional central parameter. Interestingly, the male characters in the novel appear to be entirely unaware of the gendered dimensions of their discipline. The women in the novel – both natural scientists as well as representatives of the humanities – function as 'de-constructors' of the otherwise rigid cultural norms and practices in the sciences.

In this chapter of my thesis, following my preceding discussion of the (tribal) culture of the sciences in the novel, I will outline the significance of gender in *Cantor's Dilemma* by exploring both the male as well as female characters in the novel. The gender-specific differences between the male and female research teams can be observed through the interpersonal relationships of the scientists as well as through the voices of (female) scientific 'outsiders'. In reference to the Two Cultures debate, I will demonstrate how Djerassi in fact adds to the controversy – and the genre – by highlighting the impact of gender on the culture of the sciences.

The culture of the natural sciences: Priority, brutal competition, and acts of manhood

In *Cantor's Dilemma*, Djerassi portrays the wheeling and dealing of the exclusive science tribe in academia, oftentimes referred to as 'ivory tower' – a world usually hidden from non-scientific outsiders. The novel breaks with common assumptions about the culture of science: Contrary to the popular belief that science is practiced by brilliant idealists who aim at improving the world around them and human knowledge at large, Djerassi's scientists are mostly occupied with improving their own position within the scientific hierarchy. Djerassi portrays his scientists as brutally competitive men whose acts of (masculine) dominance behavior create an unpleasant research environment for all.

The theme of competition – particularly the striving for scientific priority, recognition, and fame – are central to Djerassi's scientists in the novel. The significance of these cultural characteristics is reflected in their obsession with the prestigious Nobel Prize. All scientists in the novel display what Djerassi repeatedly likes to refer to as "Nobel lust" (Hargittai 2000, 80) – the desire to obtain the most prestigious award in the scientific world. In fact, this prize is so desirable that it "can't be refused", at least according to Djerassi's protagonist Cantor (CD 156). As Cantor lectures his mentee Stafford in a paternalistic monolog on the significance of the Nobel, so far only French philosopher Jean-Paul Sartre has refused the Nobel Prize for literature "on

philosophical grounds" (CD 157). No scientist is immune to Nobel lust – including Stafford's partner, the scientist Celestine Price who also admits that "[e]very scientist dreams about winning a Nobel Prize" (CD 147 f.).

As a result, Nobel laureates enjoy a particularly high status in the scientific community, guaranteeing them not only a space in the Olympus of science but also a position of power due to their privilege to annually nominate candidates for subsequent Nobel prizes (cf. CD 56). Cantor is highly aware of this shift of power caused by his success, as he explains to Stafford: "You'll see how, suddenly, all kinds of people will be very nice to you. Krauss, for instance …" (ibid.). "Cancer doyen" Kurt Krauss (CD 5), the alpha-male in cancer research from Harvard Medical School, stands at the top of the hierarchy of the biology department. Given the high level of competitiveness between the scientists, Cantor's ultimate success in the sciences is also a triumph over Krauss, his competitor. To Krauss, "[s]cience is more of a battle than a play" (CD 207) – not a battle of the scientist against nature's mysteries, but of scientists competing with one another for recognition and the status of pioneering in a scientific discovery.

When a scientist is particularly successful, a scientific phenomenon is named after him, as in "Krauss' sarcoma" (CD 5). This serves as a prime example for the impact of a scientist's discovery: It becomes a property assigned to its discoverer – and the scientist achieves permanent fame and recognition for her or his success. Yet, ironically, success in science results in a decrease of actual scientific practice. At prestigious universities like Harvard and MIT "that counted Nobel laureates by the dozen […], the superstars heading the labs served primarily as fund raisers and as spokesmen for their groups at major scientific congresses; they certainly didn't do any lab work themselves" (CD 38). Absurdly, the ultimate goal of a scientist leads to delegating the actual scientific work to aspiring scientists, in order to represent the scientific institution to the outside. As a result, scientific practice itself fades into the background.

Djerassi portrays the sciences as highly orchestrated, with his scientific protagonists conforming to and reproducing a specific code of conduct – particularly regarding the process of academic publication. Before Cantor publishes about his new discovery, he is invited to Krauss' seminar to present his new theory. Even seemingly minor aspects, such as *how* scientific findings are presented to other scientists, play a significant role, once again illustrating that the meta-level of scientific presentation is oftentimes more important than the science itself. Each step of Cantor's presentation of his theory of tumorigenesis is carefully composed. Krauss introduces him in a

theatrical manner: "[…] without further ado, I'll call on our speaker to enlighten us with his new theory. I. C. […] the floor is yours." (CD 8). By using language commonly associated with stage performances, Krauss emphasizes the significance of *performing* in the sciences. Contrary to the widespread belief that the sciences, unlike the arts and humanities, prioritize content over form, the code of conduct in Djerassi's novel dominates scientific discourse. Cantor's scientific breakthrough alone does not suffice – how he presents it counts towards his success as well.

In academic presentations, the scientists in the novel automatically follow and reproduce certain fixed rules, such as that "[n]o scientific lecture is ever given without slides or other aids, especially if chemical structures are to be shown" (ibid.). While such practices are certainly not exclusive to the scientific community, these seemingly secondary details are particularly significant, given the scientists' frequent claim to truth, irrespective of cultural or personal factors. Overall, Cantor's presentation reveals the rigidity of the code of conduct of the sciences. For instance, Krauss considers Cantor's faux pas of apologizing for his late arrival due to a meeting with the well-recognized Nobelist Konrad Bloch at Harvard University no less than "an act of lèse-majesté" (ibid.). Despite the tense atmosphere in the lecture room, Cantor's presentation, "as in the last movement of a symphony, [builds] up to a crescendo" (CD 10).

Usually, the etiquette at scientific talks "follows a standard ritual" (ibid.). After crediting collaborators and receiving applause by the audience, the speaker usually agrees to answer questions from the audience (cf. ibid.). Surprisingly, Cantor breaks this customary code of conduct: believing his hypothesis to be solely his, Cantor refrains from thanking collaborators. Instead of the usual applause, the audience responds with giggles, growing into "bursts of laughter", leaving Cantor "stunned" (CD 11). Cantor's unconventional presentation evokes unusual reactions, foreshadowing the groundbreaking nature of his discovery – both in content as well as in its impact on the scientific community.

The gendered quality of the tribal culture in science becomes particularly clear in the dominance behavior of the male scientists in the novel. In this regard, Kurt Krauss emerges as a master of performing such acts of dominance. When he invites Cantor to his seminar, he condescendingly refers to Cantor's work as "dabbling with a new theory of tumorigenesis" (CD 5) and, in an attempt to unsettle Cantor prior to his presentation, further interrogates him whether he has successfully developed a method of testing his hypothesis. Thanks to his well-established network of informants on the latest lab gossip, Krauss is almost certainly aware of the fact that

Cantor has yet to develop a suitable method to prove his hypothesis. During the presentation, the "professional jealousy" (CD 9) among the leading scientists and the (male) power play is evident: Krauss whispers to his neighbor "We must teach I.C. some humility in our hallowed halls, mustn't we?" (ibid.), deliberately speaking loud enough for Cantor to overhear his snarky comment. Notorious for his purposeful interruptions of presenters, with an "impeccable timing […] designed to cause the maximum amount of ego deflation" (ibid.), Krauss is portrayed as the 'top dog' in cancer research who is unwilling to make space for another (male) scientist in his territory. Given the rigid hierarchy in science, Cantor has no other choice but to accept Krauss' invitation: "When people were summoned to speak at Krauss' weekly seminar, they came." (CD 6)

Yet, given the impact and possible explosiveness of his newly developed theory, Cantor decides not to present the entirety of his ideas, "[t]hat would have to wait until the experiment was done" (ibid.). Cantor cannot afford to trust Krauss or other scientists at Harvard at this early stage of research, as his idea could be stolen by another scientist and proven through a successful experiment. Since establishing priority is the ultimate goal of each scientist, sharing one's success must be carried out carefully. Like his scientific competitors, Cantor proves to be highly aware of this specific aspect of the code of conduct in science – without this insider knowledge, Cantor would be unable to successfully navigate through the rough waters of the culture of the sciences.

Academic publications are essential in establishing priority and must be carefully planned in order to avoid having one's idea stolen in the process. In a conversation with his love interest Paula Curry, an interior designer, Cantor explains:

> A scientist's drive, his self-esteem are really based on a very simple desire: recognition by one's peers […]. That recognition is bestowed only for originality, which, quite crassly, means that you must be first. No wonder that the push for priority is enormous. And the only way we – including me – establish priority is to ask who published first. (CD 113)

Consequently, trust is something a scientist can barely afford. Cantor has to determine which prestigious scientific journal suits his strategic publication (with the ultimate goal of receiving the Nobel) better: Either *Nature* or *Science*. In order to protect his scientific discovery, Cantor has to remain as secretive as possible, even in the process of publication. Cantor decides to publish his joint paper with Stafford not in the American journal *Science* – which would be a natural choice – but instead in *Nature* magazine: "With a paper like ours, some referee will leak the news. *Nature* is in London. They're unlikely to send it to an American referee. Also, the English are more

discreet." (CD 58). However, the fear of having his idea stolen is not the only motivation for Cantor's secretiveness:

> Jerry, you know I'm not a secretive man. But in this instance, I'd like to have as little advance notice as possible. I want … fireworks: a sudden explosion! Do you know how hard that is to bring off? I'm absolutely certain that, if we submit this to *Science*, Krauss will be one of the referees. If I were the editor, I'd certainly seek his advice. I'd like to surprise Krauss – after all, he's heard the theory; he as much as challenged me to test it experimentally. *We* did it in less than three months! (ibid.)

Like many scientists, Cantor is not immune to the desire for admiration or envy from his competitors. Personal ambitions, such as outdoing rivals, are highly important to the scientists in the novel.

The process of publishing about new discoveries reveals further absurdities within the tribal culture of the sciences. Even something seemingly simple like the order of names in publications proves to be a unique challenge. Since names are usually listed alphabetically, it has led some scientists to legally change their last names (cf. CD 50) or to never publish with scientists whose last names would appear before them in publications (cf. CD 51). Also, the process of academic review before the publication might appear exotic to outsiders. One example is the so-called *pli cacheté*, French for 'sealed envelope' (sealed with red wax or a similar substance), an outdated publication practice which Cantor explains to Stafford:

> It meant that an article could be submitted so that the journal editor would date it upon receipt without, however, opening it until the author asked that the manuscript go through the editorial process. The author of a *pli cacheté* would generally request that be done only when a competitor had published, or was about to publish, the same material. Of course, his article would most likely appear later, but it would have the original submission date of the *pli cacheté* and thus demonstrate priority. […] Even Nobel Prize winners used them. (CD 62)

While Cantor names practical reasons for the the *pli cacheté*, such as an easier process of patenting (cf. CD 63), this formerly common publication practice strikes even the two scientists in the novel as rather absurd. It exemplifies one of many strategies scientists use in their race to be first. In a true Science-in-Fiction fashion, Djerassi – himself a member of the science tribe – reveals a rather unknown practice within the sealed tribal culture of the sciences. Although the *pli cacheté* itself is not a common practice in the novel's culture of the sciences anymore, it nevertheless exposes the willingness of the scientists to resort to seemingly obscure measures – at least from an outsider's perspective – to establish priority.

Even when scientists become superstars in their scientific field, the pressure to maintain their standing within the scientific community persists. This involves not

only advancing their scientific success but also strategies of interpersonal manipulation. In his interactions with Cantor, Krauss reveals that his motivation to be on top of the lab gossip is not merely to stay informed in cancer research – it is a power play to mark his territory. Krauss intends to preserve his (Harvard) "empire" (CD 6) – he puts anyone who threatens his position in their place, including Cantor.

In the novel, the male scientists are deeply engaged in acts of manhood, disguised as the code of conduct of 'doing science'. Just like manhood acts are, according to Schwalbe, "claims to membership in the privileged gender category 'men'" (Schwalbe 2014, 59), the ritualized acts of the members of Djerassi's science tribe are claims to membership in the category 'scientists' – with the two categories 'men' and 'scientists' significantly overlapping here. The novel highlights how "masculinity is not just about how men relate to women but about how men relate to each other" (Schwalbe 2014, 31). The many ritualized acts performed by Djerassi's scientists illustrate their lack of self-reflexivity. The (male) scientists are so consumed by their competitiveness – and its various manifestations – that they fail to recognize the absurdity of their shared cultural norms. Notably, Djerassi contrasts his male scientists in the novel with two female scientists and a female humanities PhD student. In this way, he further exposes the gendered cultural dynamics of Djerassi's male-dominated science tribe, as the following section will show.

The mentor-mentee-relationship as an expression of gender-specific differences in the culture of science

The brutal competitiveness in the scientists' quest for priority in *Cantor's Dilemma* renders the relationship between mentor and mentee more often than not the only trustworthy bonds within the scientific community. The novel juxtaposes two significantly different mentor-mentee-relationships: The relationship between Cantor and his young research fellow Jeremiah Stafford and the relationship between Jean Ardley and her mentee Celestine Price. In general, for graduate students in the sciences, the choice of a Ph.D. mentor is considered "the single most important decision they make when they start their graduate work. It's really like an orphan picking a new father" (CD 24). Beyond the paternalistic tone of this statement – addressed by Graham Lufkin to his then undergraduate student Celestine Price – it emphasizes the significance of the mentor-mentee-relationship in the sciences. Given the sciences' rigid norms and unspoken rules, a scientific newcomer must rely on a

guide who can successfully navigate her/his protégé(e) through the labyrinth of the sciences' code of conduct. While both research teams in the novel reflect this need for mentorship, the two teams – Cantor/Stafford and Ardley/Price – display significant differences based on gender.

The male research team Cantor/Stafford

The male duo Cantor/Stafford is a characteristic example of a dysfunctional research team. The lingering issues between the two appear to lie in the patriarchal nature of their relationship: both scientists act within a clearly hierarchal and paternalistic system of (male) power relations. Cantor, the experienced scientist, functions as Stafford's "scientific father" (CD 116), as Krauss later refers to him. However, this does not mean that Cantor cares for Stafford as a parent would for their child. Quite the contrary, Stafford's needs are secondary, often even neglected. Like in a problematic parent-child-relationship, Cantor projects his own desires, needs, experiences, and (missed) opportunities onto his mentee: "If only he'd been offered such an opportunity at the age of twenty-eight" (CD 39).

Cantor views himself in his 'scientific son' and understands Stafford as "his younger alter ego" (ibid.). Mentoring an aspiring graduate student does not appear to be an idealistic end in itself to Cantor. Rather, he needs Stafford's exceptional scientific skills for the success of his project (cf. CD 39). While this is not problematic per se, Cantor does not treat Stafford like an equal – quite the contrary, he tells Stafford what to do and denies him the opportunity to acquire knowledge independently (cf. ibid.). In a truly paternalistic fashion, he makes decisions for Stafford instead of allowing him to make his own.

Cantor's authoritarian attitude towards Stafford becomes especially clear when Stafford tells him about his (initial) decision to reject the Nobel Prize because he fears his public denunciation if the manipulation of his second experiment were to be exposed. Rather than engaging with Stafford's reasoning, Cantor replies with a "peremptory" tone (CD 155), rejects all communication in this matter and firmly tells Stafford that rejecting the Nobel is simply not an option (cf. CD 156). Like manipulating a little child for his own advantage, he proceeds to point out the benefits of receiving a Nobel Prize, such as – beyond the prize money – the immense influence within the scientific community (cf. ibid.). At a moment when Stafford clearly needs emotional support from his mentor, Cantor refuses to participate in any exchange,

interrupts Stafford, and vehemently pressures Stafford to choose the way Cantor deems best. He even goes so far as to include Stafford's partner Celestine Price, who has been present during the conversation, to apply additional pressure: "Your share is over $150,000. Better ask your fiancée how she feels about your turning *that* down." (CD 157)

At first, Celestine Price appears to be a bystander in the men's conversation, yet her role proves to be far more significant. Initially present only as emotional support, Price intervenes when her partner appears most vulnerable, redirecting the focus of the conversation back on Stafford: "'Professor Cantor,' she said, 'you've heard how Jerry feels. What do you think he should do?'" (ibid.) At various points throughout the novel, Price mediates between the two men as both Cantor and Stafford display significant problems with open communication. In a moment of crisis, the (male) research team Cantor/Stafford proves unable to function without the intervention of a (female) mediator. This highlights the paradox of Djerassi's allegedly brilliant scientists who are able to make spectacular discoveries in science, yet appear to be unable to manage seemingly minor issues, such as communicating with a research partner or handling interpersonal conflicts. The scientific 'big shots', Cantor and Stafford, are no exception here.

As shown earlier, trust and functional communication between the members of a research team are essential. At the same time, collaboration in science potentially threatens scientific success: While the combined skills of two (or more) scientists can significantly enhance the potential for scientific breakthrough, the scientists simultaneously risk their discovery to be stolen. The more scientists are involved, the higher the risk. In the novel, Cantor makes the unsettling discovery that he should have monitored the lab work of his superstar collaborator Stafford far more closely. He receives an anonymous note revealing that Stafford has been to Cantor's private laboratory on a Sunday evening, implying the possibility of a manipulation of the central experiment of Cantor and Stafford (cf. CD 93). Cantor, who only shortly before has discovered that Stafford's lab journals are incomplete, realizes that "Stafford had been such a star in [his] laboratory that [he] had never had reason to question any of his results, nor had he examined his notebook for a long time" (CD 86 f.). Angry about his failure to work more closely with his 'superstar' doctoral candidate, Cantor reduces his communication with Stafford even more drastically:

> Given what was at stake, Cantor decided to say nothing. […] By saying nothing, he considered himself still unbesmirched by any possible scandal. But silence could only buy him so much time, in which he must either verify his theory or abandon it. […]

> With the [Nobel] Prize before him […], he disappeared into his private lab, taking care now to lock it whenever he left, even for a trip to the bathroom. (CD 95)

Ironically, to the brilliant scientist Cantor, the solution to a crisis caused by a lack of communication is even less communication, resulting in a completely dysfunctional relationship to his mentee Stafford. This points towards a deeper issue in scientific culture: in the fiercely competitive race to be first, essential skills like collaboration and communication are largely overlooked and undervalued. The dysfunctional research team Cantor/Stafford shows how a greater awareness of the meta level of 'doing science' could significantly improve the outcome of their scientific project. Yet, given their exclusive focus on fame and recognition within the scientific community, the two scientists fail to recognize these communicative problems as caused by underlying cultural issues.

It is only after receiving the Nobel that Stafford begins to reflect his relationship with his (former) mentor Cantor. In an almost therapeutical manner, his partner Celestine Price asks him questions, guiding his way through self-reflection. In an extended monolog, Stafford realizes the manipulative and hierarchical quality of his relationship with his former mentor:

> When I left South Carolina to move up here, I essentially traded my parents for I.C. I'm not saying that was bad. I learned an awful lot. But in some sense, I was being manipulated. I don't think that I.C. did that consciously. Krauss, for instance, is more deliberate in his maneuvering of people, even though we see less of him than we ever saw of I.C. in his group. Maybe this is just the way things are in grad school – for years, you have intimate contact with just one professor. Especially if he likes you, it's like a parent who wants to replicate himself through his son. Has that been true of you and Jean? (CD 216 f.)

Not only does Stafford finally display the ability to critically reflect on the cultural determinants of science, he also becomes aware of its paternal nature. He realizes that his mentor's support was predominantly driven by self-interest. Ultimately, it is Stafford – not Cantor – who decides to end the relationship with his mentor and leaves the sciences altogether to move into medicine. As Ingrid Gehrke remarks, Stafford displays a potential for character development, contrary to Cantor (cf. Gehrke 2008, 119). While Cantor remains the hotshot professor in science, he has little capability of personal development. To Stafford, it is his partner Celestine Price as well as the humanities PhD student Leah Woodeson who shape and alter his thinking about the natural sciences as a culture (cf. ibid.). Cantor's hierarchical understanding of the mentor-mentee relationship in science results in toxic masculine leadership, displaying typical manifestations of Masculinity Contest Culture. He demonstrates

dominance, allows no weakness, and shows "a single-minded focus on professional success" (Berdahl et al. 2018, 430). As a result, the model of the paternalistic mentor-mentee-relationship in the 'old boys' network' ultimately fails.

The female research team as counterexample

In the novel, the lack of trust as a central characteristic in the culture of the sciences – even between mentor and mentee – is a *male* problem. Djerassi contrasts the dysfunctional male research team Cantor/Stafford with the female research team Ardley/Price. Overall, the female scientists display a heightened awareness of the significance of a personal relationship between researchers, an aspect that the male scientists in the novel seem to lack entirely. As a prospective graduate student, Jean Ardley decided against leaving Brown University for her PhD to continue her work with her female mentor and establish a female network within the scientific community. In doing so, she consciously risked 'academic inbreeding', usually a taboo in the culture of science: "Everybody urged me to go elsewhere. […] But I wanted a female role model and Brown was one of the very few American universities that had a female organic chemistry professor […]." (CD 51) The academic path of Jean Ardley was determined significantly by gender-specific factors, such as the gender of her mentor. Obviously, the male scientists in the novel – likely unconsciously – made gender-specific decisions by picking *male* advisors. Yet, for Ardley to learn first-hand from a female scientist about how to succeed in the 'old boys' club', the pool of potential mentors was significantly smaller. In this way, the novel emphasizes gender-specific barriers for female scientists in the culture of science.

As a mentor herself, Professor Ardley prioritizes a functional mentor-mentee-relationship. She describes her relationship to her mentee Celestine Price as close and cooperative:

> I see Celly almost every day; we discuss the progress of the work; I suggest certain techniques; I call important references to her attention. […] [I]n the laboratory sciences, there's both a teacher-apprentice relationship and collegiality. (CD 50).

The issue of a lack of trust, even between mentor and mentee like for Cantor and Stafford, does not appear to play a role in the research team Ardley/Price as the two women operate differently from their male colleagues. Nonetheless, Djerassi's female scientists do not entirely oppose the dominant characteristics in the culture of the sciences. They are in no way less ambitious than their male counterparts and, as

members of the scientific community, have internalized central values of the culture of science, such as priority and competition. In this context, Gehrke points out:

> With Jean and Celly Djerassi suggests an alternative model of the mentor-mentee relationship where both parties bring something to the relationship which makes them a better team. Hierarchies are still there and power is an issue, but Jean openly talks about it and discusses her position with Celly. (Gehrke 2008, 139)

The female scientists in the novel do not create an entirely 'new', 'feminine' style of doing science. Ardley and Price still very much conform to the rules of the 'old boys' network' in science – rules that at times appear quite absurd. Jean Ardley, for instance, is convinced that "[i]t's best to be first" (CD 51) and confesses to her mentee Celestine Price, as well as Price's boyfriend Stafford and Price's roommate Leah Woodeson, that she legally changed her last name in order to increase her chances to be named first in academic publications, where multiple authors are listed alphabetically:

> When I was a senior at Brown – and a very ambitious one, almost unpleasantly so – I paid very much attention to where my name would ultimately appear. Of course, I'd never published a paper; I hadn't even decided where to go to graduate school. To my father's shock, I announced one day that I would change my name from Jean Yardley to Jean Ardley. Just like that! (ibid.)

Priority in science is so crucial to success that the scientists in *Cantor's Dilemma* take rather absurd measures to be named first in publications. According to the 'lab gossip' in the novel, Cantor has never published with another scientist whose last name begins with an A or B given the alphabetical order of contributors in publications. Jerry Stafford observes: "Lucky you changed your name. […] Otherwise you would have published as Barker and Yardley." (ibid.) Here, Stafford refers to Ardley's own mentor Professor Barker and automatically assumes that the two scientists published according to the common practice of an alphabetical order of names.

However, as Ardley explains, changing her last name turned out to be unnecessary. Her female mentor and academic role model Professor Barker always chose to put her name last in publications with her mentee and thus opposed the common scientific practice. Interestingly, the removal of the "Y" in her family name can also be read as a symbolic removal of the Y-chromosome: As Jean Yardley, she was, in her own words, "very ambitious […], almost unpleasantly so" (ibid.), as Jean Ardley, on the other hand, collegiality and cooperation with other scientists play a more significant role. Ardley attributes this change of attitude to Professor Barker: She ultimately adopted this habit because she thinks that "putting your younger collaborators and students first is a nice gesture of encouragement – and even appreciation" (ibid.). In her publications with her mentee Price, she is therefore listed

as second author, allowing her mentee to receive primary attention in the scientific community.

Ardley as well as Barker understand mentorship as support for scientific newcomers and not as an egocentric, hierarchical way to improve one's own standing within the highly competitive scientific culture. The female scientists in the novel thus display a high level of *awareness* of the specific culture of science – contrary to the male scientists in the novel. To the men, collegiality and support are characteristics that appear to be incompatible with the central characteristics of the culture of science. When establishing priority is the sole guarantee for success in the scientific world, supporting other scientists is something an ambitious scientist can hardly afford. Consequently, fostering a more collegial and supportive work environment in the sciences would require a fundamental re-evaluation of the magnitude of priority and fame in science.

The contrast of the two mentor-mentee-relationships in the novel emphasizes how manifestations of masculinity within the male research team contribute to a highly dysfunctional dynamic. The female counterexample deconstructs these notions by offering an alternate model of mentorship and collaboration – at least to a certain extent. Apart from improved research conditions, the personal relationship between Ardley and Price allows the readers insights into the (fictional) realities of women in the male-dominated culture of natural science, a culture systematically excluding women and female-related issues, as I will show in the following section.

Women-in-Science: Learning about the (fictional) realities of female scientists

In terms of gender-specific differences, the introduction of the female research team already stands in stark contrast to its male counterparts. Celestine Price, together with her roommate Leah Woodeson, welcomes her mentor Jean Ardley for a private dinner at her apartment. In this informal, even intimate setting, the reader gets to know the female scientists Price and Ardley as individuals outside of their laboratory, not exclusively in their roles as scientists. Given the professional nature of their relationship, the conversations between the women of course often focus on issues related to science and their work. Yet, contrary to the male scientists in the novel, whose exchanges mostly center around showcasing their own scientific success, the women engage in critical reflections on the pitfalls of scientific culture and the repercussions of its norms for women in the field. The rigid hierarchies within the

scientific culture as well as the common separation of science and private life apply far less to the female scientists in the novel than to their male counterparts.

Even deeply private issues such as motherhood are not a taboo during the dinner of the three women – through these conversations, the readers gain insight into the realities of women in science in the novel. The first, admittedly blunt, question posed by Leah Woodeson, a PhD student in the humanities, to Jean Ardley is whether she wants to have children (cf. CD 43 f.). Given her mentor's age of thirty-four, Celestine Price confesses that she has wondered the same but never dared to ask this question (cf. ibid.). Of course, one might question why the women immediately focus on motherhood as a topic of conversation. This can be read as a stereotypical – even sexist – depiction of the women, suggesting that motherhood remains central to a woman's identity, even for highly accomplished scientists. Ardley, however, is willing to share her thoughts on motherhood, revealing that she has decided against children in favor of her scientific career:

> I've still got a few years – maybe even ten. But I might as well tell you: last year, I had my tubes tied. […] I'd been on the Pill for nearly eighteen years. I was an early starter, you see. I felt it was time to go off, even though I'm not a smoker. We could've switched to something else, condoms for instance, but I finally decided that, given my professional ambitions, I just couldn't do justice to motherhood. (CD 44)

This is a typical instance of Djerassi's Science-in-Fiction: Through the voice of Jean Ardley, the reader learns about the downsides of the Pill. As liberating and revolutionary as the Pill has been, it might not be a viable contraceptive option for women over several decades due to its significant side effects – a fact of which possibly many readers are unaware. Interestingly, Djerassi, the joint inventor of the birth control pill, indirectly argues against his biggest scientific achievement here. Once again, like in his deconstruction of the science tribe, he does not exclude himself from his criticism.

Beyond this detour to the side-effects of the Pill, Ardley's reasoning against motherhood exceeds health concerns. In her opinion, motherhood and success in science are incompatible:

> It would've been impossible [to have a child before tenure]. I'd say that in chemistry, or for that matter in most laboratory sciences, you just can't be a mother and get tenure during the six years you've got as an assistant professor. At least not in the big research universities. My male peers put in at least eighty hours a week. That's why many marriages don't work out – if they marry at all. (ibid.)

Jean Ardley highlights a central issue in examining the culture of the natural sciences: Science as an academic discipline is designed *by men for men* and thus, its structures

are inherently sexist. In order to be equally successful, Ardley would have to invest (at least) as many hours of work as her male colleagues. In her view, there would be two possible scenarios for a mother in science: either she would not be able to invest as many hours as her male peers and thus would likely fall behind in the scientific competition, or she would match (or exceed) her male colleagues' workload but sacrifice time to spend with her child(ren). Ardley claims that even a tenured position at a university – along with its professional and financial security – has not solved this problem for her:

> When they offered me tenure here, I thought, now I can have child after child and they can't do a thing about it. But […] realities are quite different. My entire group is now concentrating on a very exciting area – the chemistry of invertebrate neuropeptides – and I'm working harder than I ever did before. (CD 45)

Ardley highlights a central aspect of the culture of the natural sciences here: its failure to acknowledge life beyond the 'laboratory', such as family life, interpersonal relationships, leisure time, etc. The underrepresentation – or possibly even complete absence – of these elements of life is what I call 'the unworldliness of science'. The major obstacles Jean Ardley identifies regarding the incompatibility of motherhood and a career in the natural sciences derive from the very design of the culture within these fields. The 'old boys' network' of science – an entirely patriarchal culture – fails to address issues like pregnancy, motherhood, and the compatibility of parenthood and professionalism. Although male scientists can also be fathers, spending time with their children appears to be, at best, of secondary importance. Consequently, caregiving is considered a maternal priority – but not that of a female scientist. Ardley observes:

> Nowadays, the promotion committees are supposed to take pregnancy into consideration, but most of the people running them are still men, and older men at that. They've been taught about the legal aspects of sex discrimination but they don't know beans about the real facts. Do you know that not a single chemistry department in any of the leading American universities has ever had a woman as chairperson? Except for the famous Chien-Shiung Wu at Columbia, it would also be true in physics. Isn't it funny that they usually call her 'Madame Wu' rather than 'Professor', as if she were running a bordello? (ibid.)

Ardley refers to the real-life example of Chien-Shiung Wu (1912-1997), a world-famous Chinese-American experimental physicist, best known for her achievements in nuclear physics. Historically, she was often referred to as 'Madame Wu'. Interestingly, she vehemently objected to being addressed as 'Professor Yuan', referring to her husband's family name, insisting on being addressed as 'Professor Wu' exclusively (cf.

Chiang 2014, 220)[13]. Ardley makes a compelling observation here: Not only was Professor Wu, one of the very few leading women in physics, treated differently from her male peers because of her gender, the name which her (male) colleagues used for her alludes to prostitution. As a woman in an otherwise entirely male-dominated area, she was placed within a sexualized context.

As their conversation continues, Ardley presents another reason for her decision against motherhood: She aims at becoming the youngest female member of the National Academy of Sciences (NAS). The NAS, as she explains, is an organization of the leading researchers in the natural sciences in the USA with 1610 members, only 50 of whom are women (cf. CD 52)[14]. Sarcastically, Ardley remarks:

> I bet all 50 of them are postmenopausal. […] Now that was a nasty crack. I shouldn't have said that. The men are equally old – their mean age must be in the sixties. But I'll make it one of these days. […] Then I'll submit our own papers to the PNAS. (ibid.)[15]

Ardley chooses a proactive approach to dealing with sexism and gender disparities within the culture of science. She does not shy away from the competition with her male peers – in fact, she is willing to invest more resources than her (male) peers, recognizing her disadvantaged position as a female researcher. For her, it is not sufficient to merely become a member of the NAS (a challenge for anyone, not just for a woman) – her goal is to set a record as the youngest female member in the history of the NAS. Ardley displays extreme ambition: Even in the elitist group of the NAS, a real-life organization of the globally most notable and successful scientists, she wants to stand out – not only because of her gender but also because of her age. Clearly, she overcompensates her disadvantages in the male-dominated environment of the sciences. Yet, her influence as a single individual on changing the code of conduct seems largely limited – for a woman in science, having a seat at the table of the NAS is an incredible success per se but does not challenge the sciences' structural problems regarding gender inequality.

When Leah Woodeson asks about the reasons behind the low number of female members in the NAS, Ardley responds that there are "very few women in tenured

[13] Later in her life, Wu became an advocate for gender equality in the sciences and shed light on gender discrimination in the natural sciences, sharing the different treatment she had received in the course of her scientific career due to her gender.

[14] The number of female members of the NAS has increased over the last three decades. While there were in fact only 57 women among the 1,573 members in 1989, 59 out of 120 new elected members in 2021 were female (cf. "News from the National Academy of Sciences. 26 April 2021"). Nevertheless, the NAS lacks diversity so far as women and people of color in the NAS are still largely underrepresented today (cf. Shen 2013).

[15] The PNAS (Proceedings of the National Academy of Sciences) is the second most cited scientific journal worldwide (cf. "Top Ten Most Cited Journals"). It is an online journal published by the NAS, in which only members of the NAS are allowed to publish.

positions in chemistry in the top universities. None at Harvard, none at Princeton, none at Yale, one at Stanford. And that's where people get elected from. They don't come from Idaho or Kentucky." (CD 52 f.) Ardley demonstrates a nuanced understanding of the structural problems of women in the sciences by referring to a phenomenon known as 'The Pipeline Hypothesis'. This theory suggests that the lack of representation of a group of lower social impact – in this case women in the natural sciences – is a consequence of the smaller pool of representatives of these marginalized groups at the entry point. In other words, if only few women in natural science are at the beginning of the 'pipeline', even fewer women will reach the top positions in the respective field.[16] Unlike her male competitors, Jean Ardley displays the ability to reflect upon and deconstruct prevailing practices and values within the culture of science. For her, implementing positive change for women in the culture of science depends on a female support network, for instance choosing a female mentor and, later in her career, mentoring other female scientists from a position of power.

Ardley's mentee Celestine Price displays a similar strategy: Already before entering the world of science as a graduate student, she faces typical obstacles of a female scientist in the male-dominated culture of science. In high school, her male chemistry teacher, for instance, advises her: "Get [a Ph.D.] as quickly as possible. And if you ever want to get an academic position at a top university, you've got to get plucked into the old boys' network. […] Chemistry is still a man's world." (CD 19). Another example is Celestine's professor-turned-lover Graham Lufkin who advises Celestine to "get a female role model in graduate school and find out how she did it. What the costs are. How her male colleagues treat her" (CD 23). The women in the novel face barriers that the men not only do not encounter but of which the latter are entirely unaware. In an exchange with his girlfriend Price, Stafford exposes his own naivety regarding the glaring gender disparities in science when he boasts about the significance of his mentor Cantor in the scientific world. Stafford claims there is no other scientist of Cantor's caliber who "still does some work in the lab" (CD 30). When Price vehemently protests that her advisor Jean Ardley does so as well, Stafford patronizingly dismisses Price's argument: "'Ardley is not in I.C.'s class. She's just …' He was about to say 'a young woman' but then he compromised. 'She only started a few years ago.'" (CD 31) Evidently, Stafford uncritically reproduces the norms of the 'old boys' network'. Since successful scientists are typically male and advanced in age,

[16] Nowadays, the Pipeline hypothesis is widely contested because of its alleged lack of focus on the processes of e.g. hiring committees. Still, a certain number of leading sociologists and historians, including Stanford historian Londa Schiebinger, argue in favor of it.

scientists who deviate from these categories – whether due to age, gender, or both – are implicitly seen as less capable of achieving comparable success.

The female scientists in the novel are just as bound by the rigid conventions of the sciences as their male counterparts. Yet, they have a distinct advantage over their male colleagues: they demonstrate a high degree of self-reflexivity in the practice of science. Their marginalized position as women in science forces them to develop strategies to prevail in an environment that has systematically excluded them. While the male scientists focus exclusively on their individual scientific advancement, the women – Celestine Price, Jean Ardley, Leah Woodeson, even Cantor's partner Paula Curry – consistently engage in critical discussion, reflection, and deconstruction of the dominant norms and values within the culture of science.

The Two Cultures dichotomy in Cantor's Dilemma

With Leah Woodeson, the roommate and friend of Celestine Price and a PhD candidate in literary theory, Djerassi introduces a fascinating character through whom readers gain insight into the culture of the sciences from the perspective of the humanities. In her conversations with Celestine Price, Jean Ardley, and Jerry Stafford, she plays a key role in questioning and deconstructing the established code of conduct in science. As a representative of the humanities, she is an 'outsider' to the culture of science – yet, her questions and remarks frequently target the very core of the discussions. Unfamiliar with the cultural norms of science, Woodeson asks numerous questions – many of which Price, Ardley, and Stafford struggle to answer convincingly. A notable example of Woodeson's critical questioning concerns publication practices in the natural sciences, particularly regarding joint publications of mentors and their mentees. She pointedly asks Ardley: "Why does your name even appear on the paper? […] Wasn't Celly the one who did all the work? My adviser suggested the topic for my Ph.D. thesis but she isn't going to put her name on my articles. Why do you people do that in science?" (CD 49) Woodeson implies that established scientists take advantage of the accomplishments of aspiring scientists. Ardley, however, defends adding her name to the publications of her mentee by pointing to her responsibility as a professor to obtain research grants that enable and sustain her mentee's research. She further explains:

> I'm sorry I get so defensive, Leah. But in the laboratory sciences, there's both a teacher-apprentice relationship and collegiality which usually justify the professor being one of

> the authors. In fact, most people in the field – including Celestine – would consider me the senior author. (CD 50)

Despite Woodeson's straightforward and critical questions, Ardley remains open to productive dialog – not only in her work with her mentee Celestine Price but also beyond her research. Unlike many of her (male) colleagues in science, she is not opposed to an exchange between the sciences and the humanities. Instead, she shows particular interest in Woodeson's doctoral work on Bakhtinian dialogism (cf. CD 45 f.).

Unsurprisingly, the moment Ardley shifts the conversation to Woodeson's research in the humanities, Stafford leaves the table to go to bed. He dismissively comments that he has been lectured by Woodeson on metadiscourse and dialogism before, adding condescendingly: "Metadiscourse has a tendency to become maxidiscourse" (CD 53). With this remark, Stafford implicitly criticizes what he perceives as an alleged lack of focus and unnecessary digression of Woodeson's academic work. Despite his earlier criticism of Cantor's behavior, Stafford presents himself as a 'typical' representative of Djerassi's (male) science tribe whose ignorance, egocentricity, and lack of (self-)awareness prevent him from engaging with perspectives beyond his own microcosm in the sciences.

Unimpressed by Stafford's remarks, Woodeson gives the three scientists "a five-second explanation of deconstruction" (CD 54) and adopts the scientists' use of the personal pronoun 'we' as an example:

> [Deconstruction] uncovers meanings that are veiled or 'repressed' in a user's language. […] I know this sounds like a lecture, but let me deconstruct what you scientists have been talking about all evening. […] Jean, earlier on, when you were explaining your insect work, the question of senior authorship, and why you thought it appropriate for a chemistry professor to add her name to a paper, you always said 'we'. […] But who's that 'we'? Whom are you addressing? Is it some ideal community of science? Or is it the royal 'we' of presidents or politicians or editors? (ibid.)

Jean Ardley struggles to find answers to Woodeson's questions – even though she explains that the use of the first person singular in scientific papers should be avoided, she is unaware why: "We […] never do that in science. We're taught never to do that in a scientific paper or talk – even in the absence of any coworkers." (ibid.) Ardley displays the characteristic naivety and lack of awareness of Djerassi's science tribe. Although she criticizes many of the conventions and rules in the culture of science, she is nonetheless a member of this social group and cannot fully disengage from its code of conduct. Ardley, too, reproduces dominant cultural norms and practices she has seemingly internalized, particularly when she bases her arguments on the assumption

that science has always been 'done' a certain way – and believes this reasoning to be sufficient.

Relentlessly, Woodeson continues to dissect the cultural norms in science. Next on her agenda are the hierarchal structures of the mentor-mentee-relationships:

> But what about the big wheel up in front, who one day is supposed to nominate you for election to the National Academy of Sciences? The one who's supposed to know that you're really the senior author? I bet, with him, the 'we' signifies something else. Here, the 'we' clearly means: 'Never mind the mob, you and I know that it was really my idea […]. (CD 55)

Cornered by Woodeson's remarks, Ardley quite tellingly infers: "But that's just words, of course. It's different in the real world. We all *know* what we mean." (CD 55) Ardley reveals her ignorance of semantics in science here – she appears challenged, even blindsided by Woodeson's deconstruction of common scientific practices. Ardley deems Woodeson's statements truthful but ultimately irrelevant. In her opinion, personal pronouns are "just words" that are not "the real world". In other words, she accuses Woodeson of decrying artificial problems in science. Ardley distinguishes between 'words' and 'the real world', and through this, inadequately – and quite naively – assumes these two entities could be separated. Even more, she views 'words' as less important than 'the real world'. 'Words' represent the humanities here, while 'the real world' refers to science – with this, Ardley reproduces the established dichotomy of C. P. Snow's Two Cultures. Ultimately, Ardley appears to believe that her work in science, as part of 'the real world', is more significant than the humanities, which are 'just words' after all. Not only does she fall for the assumption that science can be separated from cultural determinants such as language, she also contradicts her own notion of objectivity in science when she argues that scientists 'know what they mean'. How can a discipline be 'objective' (if at all) when its success heavily relies on unspoken rules and the knowledge of this by its members? Essentially, Ardley acknowledges the existence of a specific code of conduct within the scientific culture, recognizing that without it, productive communication in science would be impossible.

With her critical analysis, Leah Woodeson dismantles cultural practices of which the scientists either overlook, ignore, or reproduce for their own advantage. While the female scientists Price and Ardley display a willingness to reflect upon the norms in science, Stafford does not. Nonetheless, Woodeson initiates a change of his thinking: Stafford begins to notice the use of 'we' by his mentor Cantor in their presentations on their groundbreaking experiments, which he perceives as "an

experimental demonstration of Leah's Bakhtinian analysis" (CD 82). In the novel, the voice of the humanities has a powerful impact on the scientists' work: after all, it is Woodeson who plants the seed of doubt in Stafford regarding the nature of his relationship to his mentor. Interestingly, Woodeson serves the protagonists in the novel much like Djerassi's Science-in-Literature does for the sciences as a whole. By scrutinizing the supposedly self-evident, normative aspects of scientific culture – elements that most scientists neither question nor recognize – the sciences are exposed as a cultural *construct*.

The female partners of the scientists

While Leah Woodeson serves as a critical outside voice to the natural scientists, the female partners of the male scientists also have a significant impact. Stafford's partner Celestine Price as well as Cantor's partner Paula Curry, an interior designer from Chicago, support their partners in the background and positively influence the male scientists' professional success. To Stafford, Price functions as confidante, mediator, and problem solver. She helps Stafford and Cantor improve their flawed communication – as shown before – and comes to Stafford's rescue in other professional settings. In an interview with a reporter of the *Svenska Dagbladet* prior to the Nobel Prize ceremony in Stockholm, Price acts like Stafford's public relations agent, carefully sidestepping questions by the reporter which could otherwise lead to negative press about him (cf. CD 176 f.). Price's role in the interview is so dominant that ultimately the reporter clarifies: "I am only interested in Dr. Stafford's opinion" (CD 177).

Stafford demonstrates a level of professional dependency upon Price that extends beyond the bounds of their romantic relationship. This is particularly evident when he confesses to her – and *only* her – that he has potentially manipulated his experiment by adding more enzyme without informing Cantor (cf. CD 149). Simultaneously, he does not regard Price a significant scientist. In a conversation about the upcoming Nobel ceremony in Stockholm, both Stafford and Cantor agree that Price is an unlikely candidate for a Nobel Prize (cf. CD 169). This goes beyond the (male) arrogance displayed by the scientific hotshots in the novel – in fact, Stafford is entirely ignorant of the impact Price has on his career. Limited by his own naivety and self-centeredness, he is blind to Price's remarkable ability to navigate the specific (tribal) culture in science – far more skillfully than he does.

For Cantor, his partner Paula Curry – the aunt of Celestine Price – provides an escape from the brutally competitive, at times even ruthless world of science. Although Curry, an interior designer, does not have a background in science, her opinion and advice become increasingly important to Cantor. The more Cantor distrusts his mentee Stafford, the more he shares with Curry, until she is his only confidante. With Curry, Cantor is able to escape the 'unworldliness of science' and enjoy aspects of life which otherwise seem incompatible with his scientist's lifestyle – he quite literally lives in two cultures.

In Chicago, Curry's city of residence, Cantor has a second apartment – usually on weekends or during semester breaks, Cantor indulges in art and music there. He is presented as an individual with multifaceted interests and talents, resembling a so-called 'Renaissance Man', the ideal of the High Renaissance of a polymath, like Leonardo DaVinci or Benjamin Franklin. While in the past, the versatility of the 'Renaissance Man' was highly appreciated, Cantor feels the need to separate the allegedly opposing poles of his interests and talents. Curiously, for Cantor as well as for his (male) colleagues, the sciences and the arts cannot be mixed – or when they do, it is not talked about, as in Cantor's case. In the novel, being an accomplished scientist means focusing entirely on the sciences – the reason why Cantor hides his other, 'non-scientific' interests might be influenced by his fear to be less accepted by his peers.

To Cantor, scientific work has utmost priority, even in the face of serious illness. When Stafford is absent from the lab to visit his grandfather, who has suffered a heart attack, Cantor disapproves of Stafford's allegedly misplaced priorities: "'Where's the man's loyalty, […] to his grandfather or to the lab?'" (CD 86) With this, Cantor displays a common form of (male) insensibility within the tribal culture of Djerassi's scientists. He not only lacks basic interpersonal skills such as empathy and compassion but deliberately ignores virtually all aspects of life which possibly distract him from his scientific project. To break free from his self-inflicted work ethos as a scientist, Cantor literally needs to change locations. As long as he operates in the context of his scientific work, his focus lies adamantly on doing science in a certain way – with all of its rules and limitations. The aforementioned 'unworldliness of science' does not allow for other purposes in life.

In his 'alternative' life, Cantor's partner Paula Curry functions as a link between the two cultures in his life, the sciences and the arts. Repeatedly, Curry triggers Cantor's ability to reflect upon the normativity of the sciences and thereby, reveals the latter's unawareness of the distinct features of scientific culture. Curry questions norms and conventions of the sciences and points towards its darker sides, such as the

widespread notion of *Schadenfreude* among scientists when a scientific competitor publicly fails and has to publish the retraction of an experiment (cf. CD 111 f.). Regarding his interpersonal relationships in science, Curry also has a significant impact on Cantor's career: almost like a therapist, Curry asks Cantor questions, urging him to reflect upon his relationship with his mentee Stafford, ultimately reaching the dooming realization that he "[doesn't] trust Stafford anymore" (CD 113).

The female partners in the novel relate to the male scientists similarly to how Leah Woodeson – as a representative of the humanities – interacts with them. As outsiders to the elitist and exotic scientific culture, they consistently challenge the plausibility and legitimacy of its cultural conventions. The female partners of the scientists are not mere accessories – in their function as de-constructors of the scientific culture, they are influential agents of change. However, as it is often the case for women in science, the impact of the female partners in the novel remains largely unnoticed by their men. The supposed geniuses of scientists fail to recognize the enormous impact their partners have on their scientific careers – an aspect which Djerassi revisits in his later Science-in-Theatre play *Oxygen* (2001).

Adding gender to the genre: Cantor's Dilemma *as a campus novel*

With his first Science-in-Fiction novel, Djerassi chooses the sub-genre of the so-called "campus novel" to reveal the distinct (tribal) culture of the natural sciences. Mirroring Djerassi's understanding of the natural sciences as a tribe, chemist and professor of literature Pierre Laszlo explores the specific features of the 'science tribe' in the context of the sub-genre of the campus novel in his essay "The Academic Novel: A Personal Typology" (2012). While the campus novel, also referred to as "college novel" or "academic novel", has occupied "a niche in the big house of fiction" (Laszlo 2012, 145), it has become vastly popular since the second half of the twentieth century. While the effect of C. P. Snow's lecture on the literary landscape has not been studied, I see a possible correlation between the rise of the Two Cultures debate and the increased popularity of campus novels in following decades. Set on and around the campus of a university, the rise of the campus novel is often attributed to its critical examination of campus life, highlighting the sometimes peculiar behaviors of the 'geniuses' in academia and the individual's struggle of succeeding in this environment.

Consequently, the sub-genre of the campus novel allows for an intriguing portrayal of the culture of the 'science tribe'. Laszlo contextualizes the characteristics

of the campus novel within Djerassi's tribal metaphor, asserting, for instance, that the genre "resembles ethnographic writings" (Laszlo 2012, 147). In this context, the campus serves as "[t]he natural milieu and the habitat of the tribe" where the tribe is organized by "a rigid caste system" with the professors at the top of the hierarchy (ibid.). The daily life of the members of the tribe follows "equally rigid rules and depends on the group considered" (ibid.), meaning that, for example, the rules for professors differ from those of graduate students. Another defining feature of the tribe is the existence of specific religion and/or shared beliefs. Laszlo highlights the belief that knowledge has to be spread in written form. Academic publication practices follow "strongly-held creed[s]" such as "'publish or perish'", "'do not publish identical material twice'", "'do not plagiarize'", and "'cite earlier work'" (Laszlo 2012, 150). Strict guidelines do not only apply to the writing and publishing of an academic paper, as Laszlo continues to explain:

> The presentation of a paper, as a lecture or at a conference, is also a strictly regulated genre. Even the more informal moments are, in actual fact, very much codified. For instance, participation in a faculty lunch of any sort demands witty interventions, consisting of a combination of alertness, erudition and punning. This requires training. (Laszlo 2012, 150)

Like Djerassi, Laszlo believes that a scientist has to *acquire* a specific, cultural knowledge about the natural sciences in order to maintain her or his standing in the science tribe. In all of these instances, language plays an important role as it is oftentimes used to demonstrate professional superiority (cf. ibid.).

Regarding their content, campus novels have mainly focused on issues of university politics, as Thomas Kühn states in his monograph *Two Cultures, Universities and Intellectuals. Der englische Universitätsroman der 70er und 80er Jahre im Kontext des Hochschuldiskurses* (2002). Kühn observes that the subject matters in the campus novels of the 1980s particularly focus on the contrasting movements of an "economic view of education" versus its humanistic ideal (Kühn 2002, 261). Gender, as a distinct issue, has not played a significant role in campus novels (cf. ibid.). With *Cantor's Dilemma*, Djerassi not only includes gender as a key issue in a campus novel. As my preceding literary analysis has shown, he creates a space of expression and empowerment for his (fictional) female scientists in the male-dominated realm of science and through this, significantly *adds* to the sub-genre of the campus novel.

A methodological note

I understand *Cantor's Dilemma* as the programmatic text of Djerassi's oeuvre. The novel presents the central cultural characteristics of the scientific culture – the significance of establishing priority, the fierce competition among scientists, and most importantly, the acts of manhood performed by the (male) scientists. With this, the novel prepares the cultural critique in Djerassi's subsequent literary works and constitutes a critical basis for the comprehensive engagement with gender-specific issues in science. Thus, my following literary analysis will primarily focus on aspects extending Djerassi's oeuvre, including the historicity of science and gender, the significance of gender in reproductive technology, the intersection of gender and race in science, and the interplay between science and the arts.

Gender and Historicity: The Smuggling of Historical Facts about Women in Science in *The Bourbaki Gambit* (1994) and *Oxygen* (2001)

What happens when the 'old boys' in the sciences eventually become too old and are forced to retire? The 'old boys club' of the sciences – a term I have used before which refers to the age- and gender-specific limitations of the scientific culture – can in fact be ruthless even to their well-established, yet seasoned members. In his second Science-in-Fiction novel *The Bourbaki Gambit* (1994), Djerassi explores the issues of mandatory retirement, rejuvenation of the sciences, and the (alleged) disloyalty of the academic community towards members who reach retirement age. A story about ruffled (mostly male) egos and revenge, the novel – seemingly incidentally – explores the oftentimes ignored issue of the historicity of women in science by repeatedly referencing the science salons of 18th century Europe. With his later Science-in-Theatre play *Oxygen* (2001), written in collaboration with Nobel prize laureate Roald Hoffmann, revisits this gender-specific issue – this time drawing attention on the significant scientific impact on the wives of scientists in the 18th century. In this section of my thesis, I will explore how Djerassi incorporates the historical realities of women in science into these two literary works.

The scientists in The Bourbaki Gambit *(1994)*

In the novel, the award-winning biochemist Max Weiss from Princeton University faces his retirement enforced on him by the university administration as he is reaching the age of 70. Fearing irrelevance in the scientific community – and personally offended by the sciences' age-specific discrimination when his university forces him into retirement –, Max begins to plot the so-called 'Bourbaki gambit', a scientific coup in which he, together with other scientists of retirement age, develops a groundbreaking new scientific theory. Max' plan for the research group is to publish their theory under a pseudonym, only to reveal their true identities after the successful publication. Together with Diana Ditmus-Doyle – a historian presumably in her seventies, an expert in 18th century French feminist theory and grandmother of his student Jocelyn Powers – Max puts together the research group. Their choice includes the biochemists Hiroshi Nishimura from Japan, the Austrian Sepp Krzilska, and the American Charlea Cherith Conway. Given her experience with research grants as former Dean of the Sciences and Humanities at New York University, Diana is in

charge of securing the finances for the anonymous research collective. The group decides to use the pseudonym Diana Skordylis, an allusion to their financier. In order to have access to a laboratory to perform the necessary experiments, the group decides to include Diana's granddaughter Jocelyn Powers, a biochemist PhD at Princeton, whom Max advises in her doctoral studies.

Ultimately, the anonymous research collective, following the initial idea of Sepp, develops PCR, short for polymerase chain reaction, a method for rapid DNA duplication. Given the significance of their newly developed technique, Sepp eventually decides against the anonymous publication under Diana Skordylis, as he considers this idea his best to date and desires recognition for his achievement by including his name. This breach of trust leads to the dissolution of the research collective. Jocelyn Powers, with the help of Max, Diana, and Sepp's son Jakob, secretly publishes the paper regardless – followed by a huge success which culminates in being rewarded with the prestigious Levenson Prize. Jocelyn and Diana, substituting for the allegedly sick Diana Skordylis, accept the prize, the latter using the opportunity to reveal the fake identity of Diana Skordylis by presenting a photo collage of the four retired scientists, without disclosing their true identities.

The Bourbaki Gambit expands the central issues in *Cantor's Dilemma*, the significance of recognition for scientists and its impact on science as a culture, by including the issue of ageism in science. While in *Cantor's Dilemma*, teamwork is nearly impossible for the male scientists due to their extreme competitiveness and egocentricity, in *The Bourbaki Gambit,* collaboration becomes a prerequisite for scientific success. The novel investigates the boundaries – and the absence of – recognition for scientific work. With Max, Charlea, Sepp, and Hiroshi, the readers encounter a rather diverse group of researchers, with different genders, cultural backgrounds, and sexual orientation – what unites them is their urge for revenge over being sorted out because of their age. Yet, the three male scientists of the research collective stand in opposition to their female team member Charlea – the division within the group clearly falls along gendered lines. The women in the novel, especially the historian Diana and the scientist Charlea, face a group of egocentric male scientists who display shockingly naïve notions of doing science – an aspect which becomes especially clear with regard to gender-specific issues.

Hiroshi Nishimura is presented as the exotic foreigner of the group of scientists – but remarkably, not because he is Japanese. His Asianness only seems to play a role when comparing the US-American and the Japanese academic systems. Hiroshi sees significant differences between the two systems, such as the fact that Japanese

scientists do not switch universities in order to avoid institutional inbreeding – a distinct tribal characteristic of US-American universities for Djerassi's scientists. What the two systems have in common is how much a career in the sciences dictates a scientist's life. Hiroshi even goes so far as to calling it "modern slavery" (TBG 60) due to its strictly hierarchical structure: Each academic unit – *koza* in Japanese – consists of a senior professor, an assistant professor, and a few assistants. The assistant professor completely depends on the senior professor. Hiroshi admits to having reproduced the flawed system by lac of intervention: "I never did anything about it. I just tolerated it – maybe because I survived to become a senior professor myself." (ibid.)

Despite his lack of action towards change, Hiroshi displays a distinct awareness of the cultural weaknesses of the academic system in Japanese. The main reason for this lies in Hiroshi's involvement in the arts. Not only is his wife a distinguished artist in Japan – which is why he never emigrated to the US to advance his scientific career – he is also an aspiring poet, an interest he voluntarily mentions, unlike Isidore Cantor, for example: "Did you know that I'm also a poet, Max? When I retire, I have planned to devote myself to my poetry." (TBG 61) Hiroshi brings something to the table which the other three scientists, including Charlea, lack – an interest in combining science and culture. By bringing up *renga* and *hakai*, two Japanese types of poetry in which a poem is composed by different poets and thus circumvents the notion of individual authorship, Hiroshi draws a specific connection between the Bourbaki project and poetry. Interestingly, the first collaborative work of the research group is a *renga* (cf. TBG 83 f.), creating the false pretense that the Bourbaki project overcomes the boundaries of the predominant cultural notion of competitiveness in the sciences.

Hiroshi is not an exception in this regard – even though the novel presents the poet Hiroshi as more progressive than his team members, he reaches his limits when the group discuss gender-specific issues. Hiroshi mentions Kabuki, the traditional Japanese form of theater and does not question the fact that "all female roles are played by men" (TBG 62). When he learns about Charlea's homosexuality, he confesses to Max that he does not approve of it. When Max asks him about how his grown daughters would think about this, he admits: "We do not discuss such questions." (TBG 86) Even the relentless educator Diana exhausts her possibilities when she discusses the role of women in Japan with Hiroshi:

> I wanted to know how Hiroshi's daughters feel about the status of women in Japan. Do you want to know what he told me? That he didn't know. That it was not a topic he discusses with them. Worse, he pleaded total ignorance about the Japanese women's movement, even when I prodded him ever so gently by reminding that a recent leader of the Social Democrats in Japan was a woman. (TBG, 115 f.)

For Hiroshi, the lack of communication about gender-specific issues – even with his closest family members – seems to be the norm. As Diana notes, he is entirely "oblivious to women's issues" (TBG 116). His attempts of bridging C. P. Snow's proverbial gulf between the sciences and the humanities seems limited to connecting science and poetry. Although Hiroshi does not represent Djerassi's typical one-dimensional male scientist, he remains strikingly shallow regarding gender. He appears unable to overcome the boundaries set by androcentric norms in an androcentric culture – one which, as a man, feeds his egocentricity.

Sepp Krzilska, the scientist who sacrifices the Bourbaki project for the sake of his own recognition, is unsurprisingly the most monological of the four. His first encounter with Diana reveals his underlying sexist attitude – evident, for instance, when he expresses his surprise about Diana's PhD in French history: "[…] I thought she was just a society lady. You never told me about her Doktorat. What a combination: elegance and intellect!" (TBG 87) He further asks about Diana's age, comments on it – and her outward appearance – with "Tsk, tsk. […] So old? Ah well, wealthy women do not wilt as fast as we" (ibid), ending his sexist roundhouse blow by remarking, in reference to Charlea, that he "did not expect a lesbian in [their] group" (ibid.), without further explaining the subtext of his statement. The fact that he confuses mansplaining with small talk underlines his utter lack of self-reflexivity regarding his treatment of women – he tries to lecture Diana about the etymology of the words *estrogen* and *androgen*. However, to his surprise, Diana, cannot be 'mansplained' – once again, she is far more knowledgeable than he has anticipated (cf. TBG 139).

Sepp's narrow perspective on gender roles becomes particularly clear when the research group attempts to choose a name for their fake identity. In response to Charlea's suggestion to use 'Diana Skordylis' instead of only the gender-neutral (or, more precisely, implicitly masculine) initial 'D' as a first name, Sepp merely exclaims "I disagree" and walks away (TBG 169). Much like the earlier mansplaining incident, communication with Sepp resembles a one-way street – he not only refuses to explain his rejection of the female name but also shows no interest in Charlea's reasoning behind the idea.

As a homosexual woman, Charlea demonstrates an entirely different awareness of gender-specific issues in science. In their meetings, she is the scientist who asks critical questions that help foster a more inclusive outcome. She prefers gender-conscious language (cf. TBG 133) and proposes an explicitly female name for the research collective (cf. TBG 71). Her heightened awareness of gender-specific issues is

particularly interesting as she does not conform to the common gender binary: while she identifies as a woman, she rejects certain stereotypical aspects of womanhood, such as a gender-conforming outward appearance. Much to Max' irritation, she "wore absolutely no makeup; her hair seemed to have been cut by a man's barber" (TBG 56). Contrary to the female characters in *Cantor's Dilemma*, Djerassi creates a more gender-fluid female character with Charlea, blurring the boundaries of the gender binary.

Despite her generally feminist attitude – even though she claims "I'm not a feminist" (TBG 74) – Charlea advocates for the notion that success of women in the 'old boys' club' of science ultimately depends on the individual. Her criticism of the unequal treatment of women in science does not include challenging structural issues. This becomes particularly evident in her remarks during a discussion about affirmative action: "I simply don't believe in that, especially not these days. If a woman is competent enough, she can make it in just any field." (ibid.) Charlea not only overlooks structural inequalities faced by women in science, but also appears oblivious to the fact that men have in fact benefited from gender-biased hiring for a long time, succeeding precisely *because of their gender*. By bringing up Charlea's weak – yet common – argument against affirmative action, the novel gives other voices – in this case Diana's – the opportunity to refute it. In this way, the novel challenges the (essentially American) myth of one's personal responsibility for success – and failure. Even though Charlea is presented as an important feminist voice in the male-dominated research team, she nonetheless perpetuates common patriarchal notions of the culture of science.

At first glance, Max, the first-person narrator of the novel, does not seem to differ from his male colleagues. Even though he aims for a heightened level of self-reflexivity and demonstrates a general openness to new perspectives, he frequently defaults to familiar patterns, even to the point of ignorance. This flaw becomes particularly evident in the context of women-specific issues. Despite his own criticism of ageism in science, he is obsessed with discovering Diana's age – and he is completely unaware of this contradiction in his behavior. His lack of awareness is further revealed when he follows Diana's demand to find a female researcher for the Bourbaki project. In his account of searching the National Academy of Sciences Directory for a suitable candidate, he remarks:

> It took me all of ten minutes to collect the females of the relevant species: biochemistry, genetics, cellular and developmental biology. There weren't many women, but by the time I'd finished going through the directory, I was surprised that I'd assembled a list of nearly a dozen. I knew about half of them personally and most of the rest by reputation. (TBG 52)

Surprisingly, Max is fully sincere here – the absurdity of this scene not only emphasizes the catastrophic situation for women in science but also his utter ignorance of the marginalization of women in science. Luckily, for Max, his close relationship with Diana – which ultimately leads to their marriage – includes a constant stream of feminist input. Through classics of feminist literature, such as *A Room of One's Own* by Virginia Woolf (cf. TBG 51) or feminist porn by Candida Royalle (cf. TBG 124) – the latter being quite a challenge for the rather prudish Max – Diana continuously exposes him to new perspectives. Even though Diana's motivation for this free gender-specific education remains unclear, Max is given the opportunity to broaden his admittedly limited horizon.

In their many exchanges, Diana and Max display a distinct, recurring dynamic: Diana asks the unsuspecting Max a seemingly simple question, such as "How much do you know about women in science?" (TBG 63), Max appears overwhelmed by the following conversation, and Diana educates him on the issue at question. The fact that Max is the first-person narrator only stresses his profound lack of understanding – at times even ignorance – of gender-specific issues in science. Through this narrative perspective, the reader is directly subjected to his immediate thoughts and reactions to the many inputs by Diana – and more often than not, Max does not come across as particularly brilliant. The repeated, often one-sided exchanges between Diana and Max – it is more often the case that Diana educates Max than the reverse – reveal the limitations of Max' knowledge. Once he leaves his area of expertise, the award-winning scientist Max is stripped off his prestige and power. What remains is an oftentimes insecure and surprisingly naïve man who heavily relies on the guidance of a woman from the humanities.

Curiously, the egocentricity and ignorance of all male members of the research group culminates in their very fight against ageism in science. Despite their firsthand experience of age-related discrimination in science, they fail to apply their criticism to other areas of discrimination in the sciences, such as the treatment of women. In other words, the alleged geniuses fail to understand the intersectionality of inequality in science regarding, *inter alia*, gender, age, race, or ableism, and lack awareness of power relations and privilege. In the one social category in which they have lost (some of) their privileges – age – they refuse to accept their diminished status and vow vengeance. Clearly, the scientists' motivation to teach the scientific community a lesson is their hurt (male) egos. By turning to revenge, they not only choose a stereotypically masculine compensation strategy, they also reveal their sole focus on

improving their own standing in the scientific community by harming the opponent as payback for their own suffering. Revenge is destructive – but *not deconstructive* – as it does not ultimately aim at improving the status quo for oneself and others. By turning to revenge, Max and his colleagues choose a self-centered, in fact monological approach and refuse to create a realm of exchange and reflection about the cultural norms of the sciences. Ultimately, the scientists' criticism of the cultural norms in the sciences remains utterly egocentric. With Diana, the novel presents a counterexample who chooses an alternative approach to challenging the sciences' cultural norms and in this way, illustrates the difference between destruction and deconstruction.

The role of Diana as salonnière *of the Bourbaki project*

With Diana Ditmus-Doyle, Djerassi creates one of his most complex and interesting characters. She is presented as an empowered, self-determined woman, always able to pull the strings, both in professional as well as private contexts. In fact, her self-determination goes so far she has a plan for taking her own life, should she ever be diagnosed with a terminal disease (cf. TBG 22) – she leaves nothing to fate, not even her own existence. Diana's multifaceted, at times ambivalent character is mirrored by her outward appearance: standing in sharp contrast to her youthful looks – so unusually youthful that Max develops an obsession with her age – she uses a lorgnette (cf. TBG 5). Max describes her smile as "innocent" but "framed in hard metal", which he admits "should have warned [him]" (TBG 14). This foreshadowing by the first-person narrator points towards Diana's immense power over the scientific project – and ultimately, the scientific community as a whole.

Diana does not leave the realization of her visions to chance, much less to a man. Making the acquaintance of Max – on vacation, no less – appears to be elaborately planned by her: she approaches him, recognizes him as her granddaughter Jocelyn's professor, and asks him out to dinner (cf. TBG 4). Her involvement in Max' secret project is not a coincidence either – she self-confidently proclaims "I'd like your Bourbaki to be my own, private scientific salon" (TBG 33), disclosing her distinct feminist agenda, and, in exchange, offers her financial support and expertise as her contribution to the project. Max gladly accepts, unaware that she would contribute far more than just securing the financial feasibility of the project and host the scientists' meetings.

As the financier the project, she has the power to make demands to Max and his colleagues – the fact that Max requires her help already in the early stages of conceptualizing the Bourbaki project, as Ingrid Gehrke points out (cf. Gehrke 2008, 130), further increases Diana's impact on the scientific project. As an experienced player in the world of funding of scientific projects, Diana knows the rules of the game much better than Max. Contrary to Max, Diana has both the ability to develop concrete actions and the motivation to put them into practice, while Max loses himself in self-pity (ibid.). Beyond professional experience, I see a gender-specific quality here: in order to successfully navigate in a male-dominated system, Diana has had no other choice but to develop a specific set of skills, including creative problem solving, resilience, and determination – all qualities that Max lacks.

Consequently, Max struggles to keep pace with Diana. When Max presents Diana his choice of scientists for the team, he fails to meet her expectations. He recounts:

> If I had thought [Diana] would be satisfied with my progress, I was wrong. "What about the fourth member?" she wanted to know. "Can't you find a woman?" "It's difficult enough to find a suitable man," I groaned. "Where will I find a woman? Ready to retire and in our field, to boot." "Just try," she said soothingly. "If you can produce an Austrian and a Japanese man, surely you could find an American woman. At least show that you tried. (TBG 51)

Diana knows exactly how to handle Max in order to get what she wants. Yet, contrary to the widespread misogynist trope of the female manipulator, she does not need manipulation – repeatedly, she is simply superior to Max and his colleagues. As for the female research collaborator, Max decides to do as Diana asked: "And then I said something I regretted saying, but by then it was too late. 'I'll see what I can do about finding a Nicole Bourbaki." (ibid.)

Diana displays gender-nonconforming behavior, rejecting common gender stereotypes, such as female submissiveness towards men. Her straightforward language underlines how she pulls the strings in the Bourbaki project. In an exchange with Max, she states:

> Let's drop the bureaucratic stuff and focus on the key question: The quality of a salon does not really depend on the furniture or the address, but on the quality […] of the participants. You wanted to start with no more than four. Only three more to go, then. How will you find them? (TBG 42)

Diana openly criticizes Max' usual standard in science, for instance his way of communicating with other scientists. When Max proposes sending Sepp Krzilska a letter in the mail to win him over for the Bourbaki project, Diana quickly dismisses this

idea: "'Max,' she said pityingly, 'surely you aren't going to do this by ordinary correspondence – using your quill pen, I don't doubt. Call them. Fax them." (TBG 43) With her straightforwardness, Diana displays behavior usually connected to (male) leadership. Not only is this a testament to her highly successful career as former Dean at NYU but it also highlights a curious double standard: similar behaviors displayed by a man would probably go unnoticed, considered typically *masculine* behavior.

Drawing on her background in French feminist discourse, Diana – occasionally supported by Charlea Conway – constantly directs the men's attention on feminist issues in science. In her role as *salonnière* for the Bourbaki research group, she aims at nothing less than to "reintegrate men and women in science; to reconcile science and the humanities, show them for what they really are: integral parts of something larger – something we hardly have a name for" (TBG 66). Diana advocates for a general, structural change of society to overcome the patriarchy, both in society in general, and in science in particular. Unlike Charlea Conway – or Jean Ardley and Celestine Price in *Cantor's Dilemma* – Diana repeatedly pleads that individual solutions for general societal issues do not suffice: "If you're going to change anything, […] you have to change everything. From the nursery to the workplace, from clubs to faculty senates." (TBG 72) Published published in 1994, the novel was quite ahead of its time, bringing up gender-specific issues that remain highly relevant today – its calls for fundamental, structural changes regarding gender roles are more pressing than ever.

In her role as scientific outsider – or as, according to Djerassi, 'scientifically illiterate' – Diana urges the scientists to explain their scientific projects to her, triggering alternate approaches to doing science: "[I]f you people can't make Skordylis's work understandable to me, […] then isn't there something wrong with *you*?" (TBG 106). To Diana, "patronage isn't a one-way street. […] If you want patronage, participate in the exchange. Take the effort, at least, to explain your ideas in layman's language." (ibid.) Diana repeatedly appeals to the scientists' responsibility to make their work accessible to society, especially when their research is funded by external sources. In doing so, she challenges the 'ivory tower' elitism of the sciences – science should, at least on some level, be understandable to all. Diana does what Djerassi intends to accomplish with his literary works: making scientific knowledge accessible to non-scientists by "smuggl[ing] scientific facts into the consciousness of a scientifically illiterate public" (Djerassi 2005). With Diana – like Leah Woodeson in *Cantor's Dilemma* – Djerassi creates a non-scientific character who deconstructs the predominant code of conduct in the sciences by repeatedly posing scrutinizing questions. Yet, while Leah remains the scientific outsider, Diana is part of the extended

research group, allowing her to have more impact on the actual science performed in the novel.

Diana's involvement in the research group serves as a fictional example of a successful integration of the Two Cultures. As the novel reveals, the success of this endeavor lies in functional communication – an area in which the scientists in the novel consistently fall short, and one to which Diana actively offers solutions. After Sepp's abandonment of the project for the sake of his own scientific recognition, the group chooses avoidance strategies over productive problem-solving. All four scientists of the research group, but especially the three men, lack basic communicative skills to facilitate functioning team work. Here, the reader of the novel observes the lack of dialog in the culture of the sciences to which Djerassi refers: As all four scientists decide to preoccupy themselves with their individual scientific work, they sweep the issue under the proverbial rug – that is, until Diana adamantly directs Max's attention to the problematic lack of communication between the scientists:

> "The four of you," she explained, knowing that on some level I understood, but willing to explain it to me anyway. "You've never discussed what happened. By doing nothing, you're acting as though nothing happened. Like a married couple that refuses to face the impending breakup of the marriage, all the while keeping up a good front for their friends. I have no intention of acting as a marriage counselor," she'd added. (TBG 190)

Ironically, despite her refusal to adopt the role as counselor to the estranged research group, she does in fact act like Max' therapist. Even though Max admits that it is necessary "to talk about it, *sometime*" (ibid., emphasis mine), he chooses the path of denial: he believes it is "possible to pretend D. Skordylis [is] still alive" which would be "so much easier than organizing the funeral" (TBG 190 f.). Like a good therapist, Diana "wouldn't let it rest" (TBG 191) – through her relentless (therapeutic) interventions the success of the project ultimately remains possible.

Tirelessly, Diana analyzes the dynamics within the group, detects blind spots and pitfalls, and suggests alternatives. In a conversation with Max shortly before being rewarded with the Levenson Prize, she presents a sharp analysis of the behaviors of the four scientists of the research group:

> [Sepp] craved personal recognition more than any of you, having worked all his life in an academic backwater. Hiroshi already had his emperor's vase, so he seemed to be taken more by indulging in a form of scientific Kabuki. […] Charlea […] more than any of you really wanted to test the limits of scientific collaboration. […] The idea of offering your most precious asset, your brain, to a collective seemed to me touchingly important. But each of you had a secondary motive. You were honest about yours: revenge. (TBG 198)

Diana's breakdown reveals how the Bourbaki project was ill-fated – in a research group with so many different, partly even opposing interests, successful collaboration appears to be impossible. Much to Max' surprise, Diana confesses that she "didn't think the Skordylis idea would make it" (ibid.) She admits:

> [A]s I got to know the four of you, I was struck that competitiveness was always the undercurrent, even when you were most collegial. I am beginning to think that this is the nature of the scientific animus. Actually, I found it fascinating to watch you four: you never bored me, and I learned a great deal. (ibid.)

With this assessment, Diana highlights that it is not her selfless, stereotypically feminine urge to help – without financial compensation, no less – which motivated her to continually support the research group in their unusual scientific endeavor. Apart from her desire to join the Bourbaki project to become a *salonnière*, she also reveals her interest in science from an anthropological viewpoint. Similar to Charlesworth et al. in their anthropological study *Life Among the Scientists* (1989), Diana observes the scientists in their natural habitat and analyzes their behaviors, in order to implement change in the *culture* of the sciences.

Thanks to Diana's orchestration of the publication of the article on PCR in *Nature* magazine, the Bourbaki project eventually reaches immense recognition in the scientific community, culminating in the reward of the prestigious Levenson Prize. The award ceremony functions as grand finale of the novel – and as Diana's ultimate triumph. Officially in the role of substitute for the allegedly sick Diane Skordylis, Diana enters the stage and – without having consulted with Max, Sepp, Charlea, and Hirushi beforehand – reveals the identity of Skordylis as secret research collective of four retired scientists. Using a collage of partial photos of the four scientists – so vague that they all remain anonymous – Diana teaches the academic community a memorable lesson: "[T]he individual is *not* what matters: it is the *work*, not the character, shape, gender, or physiognomy, of the scientist" (TBG 220). Remarkably, Diana not only links the category of gender to her critique of the sciences – her inclusion of "physiognomy" can also be understood as criticism of both ageism and ableism.

In her passionate plea, Diana dissects the sickly culture of the sciences and urges the audience – mainly consisting of natural scientists – to recollect the essence of science: the search for new knowledge about the world. She explains:

> In science – true science, that is – the pursuit of truth is what matters. And so it should be in the institutions that exist, finally, to serve science: in our research academies and in the foundations that support and honor scientific research. If it is otherwise, then you do no honor to the person or your Foundation. I conclude by pointing out that this year's

> prize has given you an opportunity to do both: to focus solely on the work by half the award to Diana Skordylis, who has chosen to remain anonymous; and to recognize a scientist in person, by including my granddaughter. (TBG 220)

Diana highlights the asymmetry between the ideal of 'pure' science – a discipline irrespective of personal factors – and the actual realities of the culture of science, in which the scientific endeavor is determined by individual scientist's striving for success and recognition. Overall, Diana advocates for a fundamental structural change in science in order to make science a more inclusive discipline. At the same time, she remains realistic in her efforts for change: "I am not certain whether such an ideal is truly realizable among a group of scientists, for whom individual recognition generally counts for so much. […] Let us hope that on some future occasion, another Skordylis might win a Levenson Prize." (TBG 221)

Within the Bourbaki project, Diana holds multiple roles crucial to the collective's success: Apart from her financial impact, she functions as external consultant, therapist, and educator for knowledge exceeding specific scientific facts. Compared to Diana's multitude of knowledge and skills, the scientists appear highly specialized, yet simultaneously limited – Djerassi's aforementioned *Fachidioten*. Of course, this dynamic has a gender-specific dimension: the non-scientist woman – who would stereotypically occupy the position to be taught about science – teaches the (mostly) male scientists about their own discipline. Yet, the novel's engagement with gender goes beyond the feminist qualities of its protagonist Diana. I view the gender-critical potential of the novel particularly in its incorporation of historical realities of women in science into the plot, as I will investigate in the following section.

The significance of Parisian salons

In *The Bourbaki Gambit*, gender-specific issues are not merely decorative elements to the main plot, but become significant determinants for the outcome of the whole scientific project. The most prominent example is the historical reference to the 18th century Parisian science salons – repeatedly, Diana refers to these spaces as evidence for female impact in the sciences. As previously noted, the Bourbaki project itself exists because Diana ceases the opportunity to fulfill her dream of being a *salonnière*. It is therefore worthwhile to look into the historical realities of the science salons in order to examine their significance for the novel – and their relevance for an understanding of women in science today.

In her 1999 monograph *Has Feminism Changed Science?*, science historian Londa Schiebinger defines salons as

> intellectual institutions organized and run by women. […] Though these gatherings were primarily literary in character, science was fashionable at the salons of Madame Geoffrin, Madame Helvétius, and Madame Rouchefoucauld; Madame Lavoisier received academicians at her home. (Schiebinger 1999, 27).

The issues discussed in salons included literature, politics, philosophy, and science, emphasizing the seemingly unnatural, later separation of the Two Cultures in the 19th century in the course of the professionalization and academization of science. In the salons, literature and science existed in the same realm. Historian Dena Goodman assigns the salons "a prominent role as centers of free critical discussion, […] where egalitarian rules of sociability leveled the distinctions assigned by birth and privilege" (Kale 2002, 116). With the salons as the "institutional base of the Enlightenment", the *salonnières* were "important leaders of public opinion who deserved credit for the project of Enlightenment" (ibid.). Admittedly, this particular space for women was a highly elitist circle, accessible only for members of *the haute bourgeoisie* and nobility. Nonetheless, within this group of people, the *salonnière* had immense power as she was in charge of, for instance, curating the guest list of these elitist circles.

In his analysis of the 18th century salons, historian Steven D. Kale refers to Jürgen Habermas' "institutional criteria" of the salons, which included "the equality of the participants, the authority of intellectual merit, and the suspension of the laws of market and state" (Kale 2002, 118). Social theorist Jürgen Habermas considered the salons as "pre-bourgeois" because they "did not fit the distinction between 'public' and 'private'" (ibid.), pointing towards the gender-specific quality of the salons. Since the two spheres, the public and the private, were not yet strictly separated, women still belonged in these influential circles.

Historian Joan B. Landes regards the European salons "an organ of public opinion" (Landes 1984, 22). The men at the time did not simply accept the female impact on society, as Landes points out: "The ridicule heaped on the *précieuses* by numerous male writers is a strong indication of the intrusiveness and violation with which they regarded women's interventions on the terrain of civilized discourse" (ibid.). The significant impact of the *salonnières* resulted in a patriarchal backlash – influential Enlightenment philosophers like Jean-Jacques Rousseau criticized the *salonnières* for moving too far from their destined role as mothers. Landes states that

> [Rousseau's] arguments on the family and on male and female nature were taken as a defense of the moral value of the domestic sphere, and accommodated a more restricted definition of woman's role tied especially to her maternal functions. He seemed to be

> insisting that for society to exist it may still be necessary, if not wholly desirable, for men to acquire carefully fabricated, artificial selves, a feature that is of political association itself. Women, however would achieve a form of self-realization through the cultivation of their natural selves in the private sphere (Landes 1984, 23).

Rousseau's ideal of the domestic woman was shared by many of his fellow Enlightenment philosophers – Montesquieu, for instance, understood the women's striving for equality as corrupt. Landes believes that to many, "[t]he idea of women's corruption as symptom and cause of spoiled civilization, and its obverse or the link between republican values and domestic virtues" were inextricably linked to the decay of societal virtues (ibid.). Consequently, the evolution of civilization "required the domestication of women" (ibid.). Like Landes, Dena Goodman views the exclusion of women from the public sphere "when the men of the French revolution drew the line between a male political sphere and a female domestic one" (Goodman 1992, 16). Kale points out that this line was drawn "when the revolutionaries institutionalized a Rousseauian ideology of republican motherhood in the wake of decades of male anxiety about women's participation in public life" (Kale 2002, 127). Following the gender-specific separation of the public and the private sphere, the women were ultimately shunned from all spaces exceeding the domestic sphere, including the natural sciences.

In *The Bourbaki Gambit*, Diana provides a fairly detailed analysis of Parisian science salons, based on the research of Stanford science historian Londa Schiebinger. Casually, Diana entangles the unknowing Max in a lecture on the significance of science salons for women:

> "By the way, have you read anything by Londa Schiebinger? […] *The Mind Has No Sex*. […] That's the title of her book. It deals with women in the origins of modern science. I'll lend you my copy. It's the sort of thing every male scientific *pédant* should read. […] Her thesis is that scientific institutions had their roots first in medieval monasteries and universities, and then in the Renaissance princely courts and royal academies. Now I ask you, Max, what did all these have in common? […] They were exclusively male institutions. Women had no chance in science at that time. […] So along comes the institution of the salon – in its way as influential as the early European academies – and it breaks the restraints on women's intellectual life. Three of the most important *salonnières* – the Marquise de Lambert, Madame Tencin, and Madame Geoffrin – not only attracted scientists, these women had the power to make or break an academician's reputation. Contemporary observers – men, of course […] weren't wild about this." (TBG 64 f.)

Apart from Djerassi's self-imposed didactic mission of smuggling scientific knowledge – educating a non-scientific audience about specific scientific principles and methods, for instance the polymerase chain reaction – the novel also conveys

gender-specific knowledge about the culture of the sciences. From the perspective of the humanities, it appears rather absurd that "[v]ery few scientists pay much attention to scientific history" (TBG 63). Diana criticizes the scientists' refusal to study the history of their own discipline as it reveals a regrettable lack of self-reflection of scientists – to her, "it's nothing to brag about" (ibid.). Max attempts to excuse this blind spot with the nature of the scientific endeavor: "We're just so busy keeping up with the current literature that our historical perspective covers a very short range: in a rapidly advancing field, ten years is history" (TBG 63 f.). The intersection of science history and gender is exemplary in this context: the male scientists' blindness to gender-specific issues in their discipline – including a lack of knowledge of the historical realities of women in science – seems inextricably linked to the cultural norms of the sciences. In other words, the male scientists are so preoccupied with themselves and their own research that they fail to pay attention to the repercussions of scientific culture, for example for women.

Most importantly, at no point in the novel do the male scientists display an understanding of the significance of gender in their own scientific work – they simply fail to understand that the sciences are, in fact, a *gendered* culture. To them, gender is a women's issue, focused on fighting for more impact for women in science. They ignore how their own scientific practice is deeply governed by gender bias – and how it is influenced by their notions of masculinity of how a (male) scientist ought to behave. The example of the Parisian science salons emphasizes the intellectual limitations of the scientists – historically, science has not exclusively been a men's world. Women have had significant impact in science, it was simply taken from them by men for political – and deeply misogynist – reasons.

Surprisingly, even the publishing houses of *The Bourbaki Gambit* appear to have failed to notice its gender-specific quality as there are no references to gender in the blurbs of the published books. Even though the reception of the novel focused more or less exclusively on the issues of ageism and (loss of) recognition in science, I am confident to claim that from a 21st century perspective, the novel investigates gender-critical issues which carry the whole plot. The central issues in the novel can ultimately be traced back to gender-specific notions: the striving for recognition – paired with the heightened competitiveness and egocentricity of the scientists –, the inability to facilitate functioning communication within the research team, and ultimately, the utter blindness to gender-specific issues which women face constantly in the old boys' club of science.

By examining historical spaces for women to safely practice science and have an impact on the scientific world, *The Bourbaki Gambit* not only smuggles gender-specific issues into the minds of a scientifically interested audience – the novel exemplifies how the Two Cultures, in this case history and the natural sciences, can successfully be incorporated and produce discourse useful to both disciplines. By including these historical realities into the plot of a Science-in-Fiction novel, Djerassi amends what contemporary science widely refuses to do: learn about the history of its own discipline. In the realm of fiction, Djerassi's novel explores how this can actually work – and a few years after *The Bourbaki Gambit*, Djerassi revisits and further investigates this issue by switching to the genre of drama with his play *Oxygen* (2001), which I will explore in the following section of my thesis.

Oxygen *(2001):*
Bickering men versus strategic women – the agency of Carl Djerassi's 'Wives-in-Science'

With *Oxygen*, two globally acclaimed chemists, Carl Djerassi and Roald Hoffmann – the latter a Nobel Prize laureate – joined forces in writing a play about a specific weakness in contemporary science: the lack of historical awareness – and ignorance – of the sciences on the part of scientists. While in the humanities, it is essential to understand a discipline's past in order to comprehend its present and shape its future, the focus of the natural sciences is primarily future-oriented, as the scientific endeavor merely exists to create new knowledge. Of course, universities teach the development of theories and doctrines, including outdated ones, for the purpose of understanding current theories. Yet, the natural sciences generally omit engaging in the meta-level study of *how* science was practiced – and how it is practiced today. To date, the history of science has been largely absent from most natural science curricula.

Djerassi and Hoffmann fill this gap with their play, as they "underscore the notion that the understanding of a discovery and the history behind it need to co-exist" (Pawar et al. 2018, 277). With *Oxygen*, Djerassi and Hoffmann not only advocate a more comprehensive understanding of science and scientific discoveries in their historical context, they also shed light on a related issue which tends to be overlooked or willfully neglected: the impact of the wives of scientists on their husbands' scientific success. Amid growing interest in the significance of unpaid care work performed by women, the editorial of *Nature Physics* magazine from June 2020, entitled "The invisible support", addresses the historical necessity of unpaid work of the wives of

scientists in and around the home in order to facilitate the successful career of the scientist husbands. The editorial describes the widespread image of "the lone genius working tirelessly on the research questions they have devoted their life to", further emphasizing the level of dedication to their research through "endearing anecdotes of absent-mindedness in the face of real-world chores such as housework and childcare" ("The invisible support", 2020). Beyond alluding to the aforementioned concept I refer to as 'the unworldliness of science', it is evident that research and care work are understood as hierarchical entities, with the former being more valued than the latter. Since even the most dedicated scientists cannot forego everyday realities, they heavily depend on the "invisible support" (ibid.) of another individual – commonly the wife – who takes care of the allegedly secondary aspects of everyday life. In most cases, the (unpaid) work by the wife is "taken for granted, even by the researchers themselves" (ibid.).

In recent times, this significant support of male scientists by their female partners appears to gain more interest, for instance through texts like this editorial. Yet, what has not been comprehensively studied is the *scientific* contribution of the wives of successful scientists which goes beyond household work and raising children. Given the historical realities of women in science for centuries, most women did not have the opportunity to pursue a scientific career for themselves and therefore assisted their husbands. Fame and recognition for scientific success were nonetheless ascribed solely to their scientist husbands. In the play *Oxygen*, Djerassi and Hoffmann direct the audience's attention – or the reader's attention, respectively – on the crucial scientific impact of the wives of three historically significant scientists.

The two playwrights embed this gender-specific subject matter in a plot about the Nobel Foundation's fictitious venture, set in the year 2001, of inaugurating a 'retro-Nobel' for the discoverer of oxygen – a Nobel Prize for discoveries that preceded the Nobel Prize's establishment in 1901. Even though the Nobel committee members initially anticipate a straightforward decision, a vigorous discussion soon arises: should the winner be the Swedish apothecary Carl Wilhelm Scheele (1742-1786), the first to *discover* the gas? Would the English chemist John Priestley (1733-1804) be a better choice since he first *published* on the newly discovered gas? Then again, what about Antoine Laurent Lavoisier (1743-1794), who first *understood* the nature and impact of the gas?

In the play, the committee's on-going discussions about the potential retro-Nobel winners in 2001 are paralleled by a string of actions set in the year 1777. Joined by their wives, Scheele, Priestley, and Lavoisier meet in Stockholm at the invitation of

King Gustav III. The husbands as well as the wives are engaged in similar discussions as the committee members in 2001. In addition to exploring the significance of discovery and being first in science, the play broaches the issue of the Two Cultures dichotomy and the alleged superiority of science over the humanities. In the play, the Two Cultures are inextricably connected to gender – 21st century historian Ulla Zorn, who researches the impact of wives of famous scientists, sees herself confronted with a Nobel committee consisting of three very arrogant, paternalistic male chemists who not only view their own scientific research as superior to others, but remain ignorant towards perspectives outside their androcentric worldview.

Differing centuries, similar men

Understanding science as a culture – this time, in its historical context – requires a close examination of the significance of establishing priority in science, the heart of the scientific endeavor. On both time levels of the play, 1777 and 2001, the discussions of the characters center on the dispute about who should be considered the discoverer of oxygen. The parallel action of the two time-levels aims at "a comparison of 'then' and 'now'" and thereby, emphasizes the significance of this centuries-encompassing issue in science (Zehelein 2012, 76).

The characteristic features of Djerassi's science tribe can be observed on both time levels. Similar to Djerassi's first novel *Cantor's Dilemma*, the world of science in *Oxygen* is governed by fierce competition in the scientists' quest to establish priority. The play explores what happens when the scientists are urged to cooperate: Faced with the seemingly impossible task to reach a joint decision – a rather uncommon situation for Djerassi's scientists – the male 'retro-Nobel' committee members in 2001 struggle with the incompatibility of male dominance behavior and team work. Chemist Bengt Hjalmarsson takes on the role of the 'alpha male': Compared to his two male colleagues, he appears significantly more self-assured, aggressive, and competitive. In general, Hjalmarsson can be understood as a typical representative of the 'old boys' club' of science – even though his exact age remains unknown, it can be assumed that he is at least middle-aged as he holds an established, respected position within the scientific community. Almost naturally, he claims the largest space in the retro-Nobel committee meetings by contributing the most utterances. Compared to the two other male members of the committee, he makes about a third more utterances – and he is the only committee member to deliver longer monologs. From a communicative

perspective, Hjalmarsson is presented as a *sender* and less as a receiver of information – and can therefore be understood as Djerassi's typical, monological scientist.

With Hjalmarsson positioned as the alpha male, his two male colleagues, the chemists Ulf Svanholm and Sune Kallstenius have to take on a more subordinate position within the committee – their verbal contributions are less frequent and much shorter. Nonetheless, they display similar egocentric tendencies within the committee. The two are invested in a personal quarrel which they inappropriately bring up during the retro-Nobel committee meetings several times: Svanholm accuses Kallstenius of passing on information to another chemist at Stanford University about his latest scientific findings, who then went ahead and published about it (cf. OXY 22 f.). Despite the committee chair Astrid Rosenqvist's demand to "bury the hatchet" (OXY 18) in order to facilitate a productive exchange within the committee, Svanholm considers his scientific loss too profound to be ignored. Beyond emphasizing the egocentricity of the scientists, Djerassi and Hoffmann highlight the elementary danger in science that a discovery can be stolen by a fellow scientist.

Consequently, doing somebody a favor is only worthwhile if it is rewarding – if the favor is likely to be returned. To Hjalmarsson, serving on the retro Nobel committee is not desirable to him since "the dead don't repay favors" (OXY 11). Engagement on behalf of others, even for the scientific endeavor itself, is pointless – there is no room for altruism in Djerassi's science tribe. It is therefore not surprising that Hjalmarsson does not show appreciation for other scientists' achievements. While his colleague Svanholm certainly shares Hjalmarsson's egocentricity, he appears to have an advantage over him – he has experienced failure. The loss of a discovery urges him to reflect upon the absurdity of the principle of priority in science. In a private conversation with Hjalmarsson, he remarks: "We're always in a race where being first counts for everything. If you're second, you might as well be last. There's only a Gold Medal (…) but no silver or bronze" (OXY 23). Not only is working under these conditions highly demanding to the individual scientist, the scientific endeavor itself becomes secondary. Svanholm remarks that all scientists are prone to "the Nobel syndrome: who did what first?" (OXY 32), further underscoring the scientists' central motivation of doing science.

In their vivid discussion about the potential discoverers of oxygen, the male scientists reveal an understanding of ambition as fuel for success, while simultaneously considering it a source of various problems within the scientific community. Svanholm compares ambition in science to a flaw in an expensive carpet: "What's wrong with ambition? Look at it as the blemish in a Persian carpet that makes

it valuable" (OXY 55). His colleague Kallstenius disagrees and raises the question: "Does that mean that a carpet without blemishes cannot be as valuable … or even more so?" (ibid.). To Kallstenius, a blemish is nonetheless a flaw, indirectly proposing the idea that science would function – maybe even better – without ambition as its catalyst. Hjalmarsson demonstrates a similar understanding of the culture of science:

> You're confusing science with scientists. […] Science is a system … a search driven by curiosity, all the time touching base with what's real … That system works … […] Scientists might be after priority … power … money … […] But another part of me also knows that science is not always about power … or control … or even progress. As long as they publish, […] someone will check their work. […] The more interesting the discovery, the more closely it will be checked. (OXY 78)

Hjalmarsson reveals a rather naïve understanding of science: to him, science itself is pure and flawless – it is the individual scientist who is the main cause of conflicts within the scientific world. According of this notion of 'science versus the individual', the scientific endeavor is seen as a perfect system – one that can be detached from those who practice it. The science's negative aspects are allegedly caused only by human flaws, such as envy and the pursuit of power and recognition. Hjalmarsson believes in the correction of these errors by the scientific method itself, eliminating the possibilities of dishonesty and betrayal. The female scientists Astrid Rosenqvist and Madame Lavoisier agree with this notion of a separation of science and scientists, yet provide a more differentiated and less realistic view. To Madame Lavoisier, "[t]he product of science is knowledge … but the product of scientists is reputation" (OXY 5). Astrid Rosenqvist, the Nobel committee's chair, calls the striving for priority "the occupational disease of scientists", supporting this claim by noting that scientists are "not in it for the money" (OXY 34). Instead, success is measured by identifying who is *primus inter pares* – to Rosenqvist, this means being the first female chair of a Nobel committee (cf. ibid.).

This scene reveals that priority – a central element in science – is in fact *gendered*: while the male scientists focus exclusively on breakthroughs in their research, the female scientists are faced with women-specific barriers which hinder – or at least complicate – their research. Yet, for all scientists, irrespective of gender, fame and peer recognition remain their key motivation. Bengt Hjalmarsson exemplifies this dynamic: He has joined the committee because he likes "the power… and the gossip" (OXY 11) and not because he wants to support the idealistically significant work of the Nobel foundation of honoring outstanding breakthroughs in science. As a typical representative of Djerassi' (male) scientists, Hjalmarsson is driven entirely by self-interest.

Most significantly, Hjalmarsson's egocentricity – reflecting his androcentric view of the sciences – can be observed in his patronizing treatment of women in science. His language mirrors his male-centered concept of science, for instance, as he refers to Astrid Rosenqvist as "chairman" of the committee (OXY 11). Even more, in a conversation with his colleagues Kallstenius and Svanholm, he makes a sexist remark about how Rosenqvist "always gets her way" (OXY 12), referring to his personal knowledge about her as her former lover. Threatened by Rosenqvist's superior position in the committee's hierarchy and her exceptional scientific success, Hjalmarsson tries to humiliate her in front of the other male members of the committee by implicitly referring to their former intimate relationship. His behavior reveals his patriarchal understanding of sexuality: He evidently views sexual encounters with a woman as a way to dominate the female. Furthermore, with this remark resembling 'locker room talk', Hjalmarsson displays a rather primitive, archaic male dominance behavior among his male colleagues.

Kallstenius and Svanholm display a similarly androcentric, patriarchal view of science. Despite the limited sources of information about the historical figures Lavoisier, Scheele, and Priestley, none of the male committee members even considers including the wives of the scientists in their research. When discussing potential historical sources about the retro Nobel candidates, Svanholm suggests to focus on "[t]he obvious witnesses: other scientists of that time" (OXY 18). The utter ignorance of the wives of the scientists by the members of the retro-Nobel committee is emphasized by the fact that it is the wives who open the play: In the first scene of the play they – not their husbands – discuss the discovery of oxygen. With this, Djerassi and Hoffmann cleverly demonstrate the undeniable impact of the wives of the scientists – an impact that has not only been underestimated but entirely ignored by the alleged geniuses of the retro-Nobel committee. Finally, it is Ulla Zorn, the committee's amanuensis and not-yet-revealed doctoral candidate of history, who suggests to include the wives of Lavoisier, Scheele, and Priestley in their research – much to the surprise of the male committee members, further emphasizing their ignorance. With her unanticipated input, Zorn foreshadows her key role in the committee's quest of determining the laureate for the first retro-Nobel.

Curiously, despite the different time periods, the principles of doing science in 1777 do not seem to differ drastically from their millennial counterparts – priority, ambition, and competition hold similarly significant roles. The more ambitious and successful a scientist, the more ruthless he becomes. Scheele is presented as the most harmless of the three: Djerassi and Hoffmann depict him as the kind of scientist whose

focus lies entirely on his research and whose modest desire is to "be [his] own master" and "earn enough money" to support widowed Fru Pohl and her son (OXY 49). In his exchanges with Madame Lavoisier and her husband, Scheele repeatedly attempts to inquire about his letter to Monsieur Lavoisier about his theory of *Feuerluft*, yet allows both Lavoisiers to sidestep the issue several times. His partner Fru Pohl, on the other hand, is far more direct and persistent: in a conversation with Monsieur Lavoisier, she claims that "Madame Lavoisier was not disarmed" in the sauna and asks Monsieur Lavoisier about his motivation to accept the King's invitation to Stockholm, implying an ulterior motif (cf. OXY 39). Monsieur Lavoisier calls Fru Pohl "disarmingly persistent" (OXY 38) and "clever" (OXY 39).

Compared to Scheele, Priestley displays a more distinct level of ambition. Especially in his exchanges with Monsieur Lavoisier, he acts rather aggressively and views Lavoisier as his competitor (cf. OXY 70). Interestingly, he patronizes Scheele by treating him like his lab assistant when he asks him to perform an experiment to prove his point to Lavoisier (cf. OXY 73). All three scientists – but mostly Lavoisier and Priestley – engage in relentless disputes about the discovery of oxygen, to the extent that the King ultimately refuses to reward any of the three, as the King's Court Herald declares: "Three savants? Yet you cannot agree? So be it. (Pause.) The king will not reward you!" (OXY 90). These supposedly rational and objective geniuses act entirely motivated by their emotions and resemble bickering children whose parent must intervene and impose a punishment. With this, the play deconstructs the notion of the historical reality of 'pure' science, separate from personal factors. Even as early as 1777, the three scientists fail to move beyond their egos – and in doing so, fail altogether. In this regard, Ingrid Gehrke highlights the paradox of Djerassi's scientist: "[R]elationships are more important for the researcher's success than scientific findings, but the male scientists portrayed seem mostly unable to establish and nurture relationships with their peers" (Gehrke 2012, 136). It is therefore worthwhile to turn attention to their female counterparts. The wives of the three scientists in the play display much more sophisticated strategies to secure priority for their husbands – yet remain largely unrecognized.

The wives of scientists: Important assistants in and outside the laboratory

The play presents three rather different wives[17]: Firstly, thirty-five-year-old Mary Priestley, wife of minister and chemist Joseph Priestley, a religious and rather reserved mother of four. Secondly, Sara Margaretha Pohl, aged twenty-six, a young widow and mother, depicted as a devoted and rather unobtrusive companion to Carl Scheele, keeping his house and ultimately becoming his wife. Thirdly, the youngest of the three, Marie Anne Pierrette Paulze Lavoisier, only nineteen years old and a passionate and ambitious young woman, highly dedicated to her husband and his work. Particularly Madame Lavoisier plays a significant role in her husband's career, both professionally and emotionally. She actively contributes to his success by assisting him with experiments and keeps his correspondence. As the play unfolds, these circumstances allow her to take matters into her own hands and even manipulate her husband's career.

The opening scene of the play unfolds the three partners' characters in the revealing setting of a Swedish sauna:

> MME. LAVOISIER (*dreamily*)
> I have never been beaten before . . . not like that. Can we do it again?
> MRS. PRIESTLEY
> Madame! In England, the birch is used for chastisement.
> FRU POHL
> In Sweden, we consider it healthy. It brings the blood to the surface. So much better than leeches.
> MRS. PRIESTLEY (*as towel slips off her shoulder, she quickly pulls it up*):
> The immodesty of the sauna disquiets me.
> MME. LAVOISIER (*deliberately lowers her towel while addressing Mrs. Priestley*):
> Mrs. Priestley . . . we are just women. […]. (OXY 3)

This "classical, not to say Aristotelian exposition of both characters and themes" (Zehelein 2012, 78) strikingly presents the significant differences between the three wives. Each woman's reaction to the physical exposure in the sauna reflects her personality – as Scheele accurately remarks later in the play: "Not much is hidden in a sauna." (OXY 83) Mrs. Priestley, the minister's wife, expresses her discomfort and tries to prevent the conversation from taking a physical or even sexual turn – she reacts with indignation about Madame Lavoisier's openly expressed pleasure of being beaten with birch branches.

[17] In the play, Carl Wilhelm Scheele and Fru Pohl are not yet married. Since Scheele and Pohl did marry shortly before Scheele's death, I am referring to Pohl as Scheele's wife.

Fru Pohl is presented as a rather levelheaded, down-to-earth character as she focuses on the birch's practical purpose for improving one's health. Madame Lavoisier, conforming to the French cliché of sexual freedom, is the most poised, self-confident woman of the three. When Mrs. Priestley covers herself with a towel, Madame Lavoisier even parades more of her body to provoke her (cf. OXY 1). She coquets with her physicality and femininity, and the presence of older, more experienced women does not seem to intimidate her. Madame Lavoisier expresses a similar self-confidence in the context of her childless marriage of six years as she perceives herself as a complete, accomplished woman. Contrary to Mrs. Priestley's perception that bearing children is an "obligation" of a wife (OXY 4), Madame Lavoisier considers her childlessness "a matter of taste" (ibid.) and ignores the common societal expectation of women to become mothers. Regarding her marriage, she proudly tells the other wives how she *chose* to marry Monsieur Lavoisier at the very young age of thirteen to avert "the attentions of a Count" (OXY 5) – Madame Lavoisier repeatedly emphasizes her agency. In a scientific context, Madame Lavoisier emphasizes her level of self-determination as well. She dares to take matters into her own hands, as opposed to her female counterparts Fru Pohl and Mrs. Priestley, who more often than not prefer to remain unobtrusive. Very early into the play, the audience perceives Madame Lavoisier as unconventional, empowered and one step ahead of her rivals, be it by her deliberate self-expression to avoid judgment and awkward queries by the other wives, or by taking pride in her independence.

In general, the wives' conversations center largely on their husbands' chemical endeavors – just as the men quarrel about the discovery of oxygen, so do their wives. In their discussions, most of which take place in the disarming setting of the sauna, the women each argue for their partners to be the discoverer of the gas – yet again, it is Madame Lavoisier who is the most opinionated and adamant in this context. Contrary to Mrs. Priestley and Fru Pohl, Madame Lavoisier fully *identifies* with her husband's work – she considers her husband's work to be *equally her work*. Not only does she support her husband's inquiries in the role of a devoted wife, she presents herself as a proactive *partner* in his chemical endeavors. Consequently, she expects to receive and deserve recognition for her share as well. Her identification with her husband's work becomes specifically clear in her repetitive use of the pronouns "we" and "our" when referring to their scientific discoveries and experiments: "*We* are not convinced" (OXY 6), "The same air *we* expire … the one *we* remove by passage through limewater" (OXY 69), "*we* all did it" (ibid.) "this is why *we* called that new air eminently respirable" (OXY 71), "*our* experiments are quite complex" (OXY 75 – all italics mine).

Repeatedly, Madame Lavoisier steps out of her husband's shadow and claims recognition for her influence on his scientific achievements. She views herself and her husband as partners and collaborators – both regarding their marriage *and* science – and thus believes she has made significant contributions to Monsieur Lavoisier's scientific success. Emphasizing her supposed proficiency and eligibility to be involved in her husband's research, she likes to point out that Monsieur Lavoisier "asked [her] to assist him in his endeavors" at the significantly young age of thirteen (OXY 5). She describes her work with her husband as follows:

> There was chemistry to study. Art, too. I took lessons with Jacques-Louis David … all to help my husband. *(She muses)* Each day in the laboratory, I made a list of what experiments were to be done. Antoine called out the numbers, I wrote them down. I drew the plates for his books … I etched them. I corrected them. […] There was Latin to learn and English, too. It is I, Mrs. Priestley, who translated Dr. Priestley's *Experiments on Different Kinds of Airs* … and his writings on phlogiston. (OXY 6)

Evidently, Madame Lavoisier's role in her husband's professional life is more than that of a by-stander – she is not the typical wife of a 18th century chemist who (at best) provides her husband with emotional support in his career. Instead, she is so knowledgeable in his field that she *corrects mistakes* and provides skills in areas in which her husband is rather inexperienced, such as translation from English into French and vice versa.

It is especially her knowledge of languages and translation that grants Madame Lavoisier considerable influence over her husband's and other prestigious scientists' work, like Dr. Priestley's. In an encounter with Priestley, she denies having left out information when she translated Priestley's explanations in a conversation with her husband regarding his findings about oxygen (cf. OXY 41). She strategically downplays her English language skills – regardless, Priestley is very aware of her power as a translator of the work of two notable scientists. Her tactical moves and attempts of manipulation make Madame Lavoisier a key figure in the quest for the discoverer of oxygen. Just like Priestley, Fru Pohl is aware of Madame Lavoisier's substantial influence and her close collaboration with her husband (cf. OXY 20 f.). In her conversation with Monsieur Lavoisier about the wives' encounter in the sauna, Fru Pohl demonstrates her knowledge of Madame Lavoisier's wheeling and dealing:

> FRU POHL
> Yesterday … in the sauna –
> LAVOISIER *(quickly)*
> A curious Nordic custom … but one my wife found bracing.
> FRU POHL
> It was my idea to invite the ladies.

LAVOISIER
Nudity can be disarming.
FRU POHL
Madame Lavoisier was not disarmed.
LAVOISIER
Of course to disarm … one first needs to be armed.
FRU POHL
Your wife was.
LAVOISIER
Madame Pohl, you are observant.
FRU POHL
Women from the countryside have to be.
LAVOISIER
Touché, Madame. (OXY 38 f.)

The war vocabulary ("armed"/"disarmed") represents the battles fought in science – competition, ambition, and establishing priority result in mistrust within the scientific community and call for tactical behavior. Both Madame Lavoisier and Fru Pohl are fully aware of these circumstances and act accordingly – Madame Lavoisier fairly actively, Fru Pohl more passively. However, Fru Pohl should by no means be understood as naïve or uninvolved – she carefully observes Madame Lavoisier's moves and functions as an important informant and advisor to her later husband Scheele. Despite the fact that she chooses to act in the background, she comprehends the rules of the game of science very well, just as Madame Lavoisier does.

All three wives in the play seem to understand the wheeling and dealing in science much better than their husbands. While the chemist husbands tend to focus mainly on their scientific research, their wives orchestrate the processes revolving the science. The contents of the conversations between the wives – aspects that might be dismissed as negligible chit-chat or gossip – have a significant impact on the careers of three prestigious scientists. Given the competitive nature of the culture of science, only husband and wife can fully trust each other. The play presents the competition over the discovery of oxygen as a battle fought by *three teams*, not by three individual chemists. The women are their husbands' 'partners in crime' – they are their husbands' informants, advisors, and presumably their only confidantes. Yet, this partnership is one-sided – the wives support their husbands in their scientific careers but face gender-specific obstacles as women in science of which their husbands appear entirely unaware.

Paralleling obstacles of women in science in 1777 and 2001

In *Oxygen*, Djerassi and Hoffmann portray the enduring struggles of women in science – both in 1777 and 2001 – demonstrating how history continues to echo in the present. For Madame Lavoisier, her engagement in science results in the fact that she never has children with her husband – the reasons remain unknown in the play. Yet, she does not consider her childlessness a deficit. After her first encounter with Fru Pohl and Mrs. Priestley in the sauna, she expresses her frustration over Fru Pohl's blunt questions concerning questions of motherhood (cf. OXY 9). Apart from this intrusion of her privacy, Madame Lavoisier appears to be particularly irritated by the primary focus on a woman's reproductive decisions instead of her professional success.

Notably, the most knowledgeable and ambitious wife of the three, Madame Lavoisier, is presented the least maternal – vice versa, Mrs. Priestley, a mother of four, plays the least significant role in the scientific endeavor of her husband. Drawing upon patriarchal notions of motherhood, it appears like stereotypically masculine characteristics, such as ambition and success, stand in opposition to maternity. This is paralleled by the situation of Astrid Rosenqvist, the head of the 2001 retro-Nobel committee:

> ULLA ZORN
> How important is that to you … being first?
> ASTRID ROSENQVIST
> You are beginning to sounds like a district attorney … or a shrink.
> ULLA ZORN
> Sorry about that. I just wanted to know what price you're willing to pay to be successful as a scientist … and as a woman.
> ASTRID ROSENQVIST
> I have no children. Many would consider that a heavy price.
> ULLA ZORN
> Like Madame Lavoisier? *(Pause)* Is the committee your child?
> ASTRID ROSENQVIST
> It certainly doesn't feel or behave like a baby … but it's a challenge. […]
> (OXY 35 f.)

As a successful woman in the male-dominated culture of science, Rosenqvist represents a significant number of female scientists who sacrifice the possibility of motherhood in order to remain competitive in science[18]. Even though the reasons for her childlessness are not entirely disclosed, Astrid Rosenqvist indicates that she has

[18] With this, Djerassi and Hoffmann allude to realities of many female scientists, as, for instance, Londa Schiebinger explores in her monography *Has Feminism Changed Science?* (1999), a text which I will further discuss later in this thesis.

chosen science over motherhood (cf. ibid.). In the culture of science with its absurd levels of competition, taking time off to have a child seems impossible. This chapter will later revisit the issue of motherhood in science, examining how Djerassi explores this issue in other literary works and proposes alternative models of motherhood to foster the compatibility of science and motherhood.

Masking and masquerade in science

Beyond the issue of (in)compatibility of motherhood and science, Djerassi and Hoffmann highlight another significant obstacle of women in science: the lack of recognition for their work. It is particularly Madame Lavoisier who voices her desire for acknowledgement of her scientific impact, both by the other chemists' partners and particularly by her husband. In her monologue concluding the first scene, she claims:

> I helped Antoine in the laboratory … as in the salon. But when he reasoned out how we breathe … how sulfur burns … how to make better gunpowder … he spoke to men: to Monsieur Monge … to Monsieur Laplace … to Monsieur Turgot. *(Pause)* But not to me. *(Pause)* Yet I helped Antoine in ways he doesn't know about … and never will. But I must be careful with Mme. Priestley … and now, I see, also with Mme. Pohl. We did not come to Stockholm to make mistakes. So … we talk women's talk. About our husbands, of course. How <u>good</u> they are. How we help them. *(Pause)* Wearing the woman's mask … her husband's face on it … smiling politely. (OXY 9)

Madame Lavoisier experiences an inner conflict: on the one hand, she supports her husband in his scientific achievements and enjoys having an impact on his scientific work. On the other hand, she lacks appreciation by her husband for her professional commitment. While her motivation for supporting her husband's career is not fully revealed, her love for Monsieur Lavoisier appears to be only one of her reasons – her driving force is her interest in science. Given the historical realities of women in science in the 18th century and the general lack of opportunities available for them, Madame Lavoisier seems to make the most of her limited circumstances. Thus, supporting her husband – and at best *sharing* his career with him – might be her only option to contribute to the scientific world.

However, her husband does not appear to acknowledge her substantial influence on his scientific success – Monsieur Lavoisier prefers the exchange with male scientists of high standing. In a conversation with Scheele and Priestley, he refers to an experiment with vital air as "[his] own work" (OXY 72) – he does not mention his wife, even though she is known to assist him in all his experiments (cf. OXY 74 f.). The

lack of acknowledgement for Madame Lavoisier's scientific achievements can be understood as a specific manifestation of the 'Matilda effect', to which I have referred in the introductory chapter of this thesis. Madame Lavoisier's accomplishments are fully attributed to her husband and her impact remains entirely invisible. In this context, she describes herself as "wearing the woman's mask … her husband's face on it … smiling politely" (OXY 9). Using the metaphor of the mask, Madame Lavoisier feels that she has to keep in the background – not only is she, the scientist's wife, expected to conform to her husband's opinions and actions, she has to disguise her own 'face', the part of herself presented to the outside world.

The mask, in fact, serves as a recurring metaphor in the play, representing the notion of gender-specific masquerade in the culture of the natural sciences. In both psychoanalysis and gender theory, masking has been studied extensively. Psychoanalyst Joan Riviere determines in her essay "Womanliness as a Masquerade" that

> women opt for a "mask of womanliness" to assuage the anxiety or retribution feared by men when they assert themselves in spaces that are conventionally masculine. This strategy of making men feel safe by exhibiting conventional attributes of femininity provides a way for women to claim symbolic space (intellectually etc.) that is not "properly" theirs. (Riviere 1929, 306).

By "smiling politely", Madame Lavoisier condones the lack of appreciation for her impact, simply because of a lack of alternatives – if she manages to make meaningful contributions to science, it is only through her husband who facilitates her entrance to the male-dominated world of science. Thus, using the biblical proverb, she better does not bite the hand that feeds her, further highlighting the patriarchal realities of female oppression through men. As psychoanalyst Paige Sweet amplifies in her 2023 essay "Mask Up: Identifying Anger in Gender and Racial Formations", masking in gender-specific contexts is used to extenuate anger caused by gender nonconforming behaviors. Sweet assesses that

> [t]he mask of womanliness involves the whole body—gestures, voice tone, contracting the body, and so on. The goal is to communicate through the body that you are not a threat to the masculinity of your interlocutors—indeed, you are its very heterosexual complement! This description seems to locate anger in men and positions women as needing to employ masquerade to protect themselves against the anger they arouse (Sweet 2023, 192).

Masking especially occurs in situations "when appropriating positions of power" (Sweet 2023, 194). The attempt to use masking to compensate their "transgression of white phallic symbolic order" (ibid.) can lead to seemingly contradictory behavior, as it is case for Madame Lavoisier: Some women smile in response to oppressive

experiences – even humiliation, harassment, or danger – in order to alleviate the effects of their nonconforming behavior (cf. Olsen 2016).

Yet, it is not only the women in the play who feel pressured to mask their true selves. During a discussion about Kallstenius' alleged betrayal, Hjalmarsson states in a conversation with Svanholm: "I wouldn't blame Sune. He's too honest … you just have to look at his face", to which Svanholm responds: "I think you're on his side. We all wear masks." (OXY 23) To Svanholm, science is practiced within an environment in which disguising one's real 'face' is the norm. Honesty and trust are considered secondary or possibly even stand in the way of success in science. Moreover, there is a gender-specific quality also to the male masking in the play: in the context of the gendered code of conduct in the sciences, including acts of manhood as manifestation of (male) dominance within the scientific culture, an honest man like Sune does not act according to his gender. As Sweet argues,

> masquerades of masculinity might accomplish something similar to masquerades of femininity in terms of a gendered performance geared toward anticipating aggressive reprisals for violating gender norms. In both cases, the masquerade is employed to "avert reprisals," that is, the anger of the interlocutor whose hackles will be raised at the transgression of gendered expectations. (Sweet 2023, 192)

The use of the metaphor of the mask culminates in the Lavoisiers' masque, a short play within the play in honor of Sweden's king Gustav III. entitled "The Victory of Vital Air over Phlogiston" (OXY 42). Despite their claim that the masque's purpose is intended purely for entertainment, the couple's true aim is to prove the validity of Monsieur Lavoisier's theory of oxygen and discredit the competing (and false) theories of Priestley and Scheele. Curiously, it is Madame Lavoisier who takes on the role of oxygen, while her husband portrays phlogiston, a chemical element strongly defended by Priestley but later proven to be non-existent. In the masque, it is Madame Lavoisier's role, not her husband's, to represent truth, knowledge, and scientific progress on stage. Her portion in the masque includes forty lines, whereas her husband only gets to utter twenty-five. Not only does she have a much more prominent role in the masque, she also *explains* to the audience the experiments her husband is performing on stage.

With this, Madame Lavoisier mirrors what literary scholar Terry Castle considers the opportunity of female empowerment which the masquerade offered to women of the 18th century. Castle explains that

> With the anonymity of the mask ... the eighteenth-century woman made an abrupt exit from the system of sexual domination. For a brief, charged moment, the masquerade suspended the archaic pattern of Western gender relations. […] [T]he masquerade was indeed a microcosm in which the external forms of sexual subordination had ceased to

> exist. The masquerade symbolized a realm of women unmarked by patriarchy, unmarked by the signs of exchange and domination, and independent of the prevailing sexual economy of eighteenth- century culture. (Castle 1986, 254).

In this context, the performance of the masquerade on stage – that is, when the play is actually performed – plays a crucial role: the audience observes Madame Lavoisier on stage performing gender nonconforming behavior by help of the masque. The visual element itself is "undeniably provocative", as Castle points out: "[O]ne took one's pleasure, above all, in seeing and being seen." (Castle 1986, 255) This level of exhibitionism on stage gives Madame Lavoisier immense (and rare) power, both over the audiences within the play and the viewers beyond it as well as over the message she conveys.

Thus, Madame Lavoisier functions as the essential link between the performance on stage and the audience – it is her role to educate the king and the two notable scientists Scheele and Priestley and, more importantly, to falsify the two scientists' research findings. Madame Lavoisier is presented as highly proficient and knowledgeable in the field of chemistry – she proves that she is an eligible participant in the dispute over the discovery of oxygen. She does not merely provide strong support to her husband – in fact, she presents herself to the audience as a *scientist*. This way, as it is typical for gender-nonconforming behavior, Madame Lavoisier irritates her audience – the performance leaves the Priestleys, Scheele and Fru Pohl so enraged that they "overturn their chairs" as they exit (OXY 45). While Monsieur Lavoisier expresses his doubt whether he and his wife "went too far" (ibid.), Madame Lavoisier unflinchingly remarks "We planted a seed … their doubt will grow" (ibid.), further highlighting her gender-nonconforming agency and determination.

Madame Lavoisier's belated triumph

Despite Madame Lavoisier's scientific expertise, her professional achievements and her impact on her husband's career is highly underrated on both time levels of the play. The play reaches its climax when Ulla Zorn reveals a discovery proving that Madame Lavoisier has an even more significant influence on her husband's, Scheele's, and Priestley's careers than initially presumed. By withholding a letter from Scheele to her husband, she deliberately took matters into her own hands and manipulated both Scheele and her husband Monsieur Lavoisier. The interception of Scheele's letter along with her intentionally selective translation of Priestley's report about his recent

discoveries at a dinner with Monsieur Lavoisier (cf. OXY 41) unveil Madame Lavoisier's immense influence as well as her willingness and power to control the course of history. The truth is to be found in her *nécessaire*: hidden in her travel chest, disguised as a book entitled *Histoire des Théatre* [sic!], Ulla Zorn discovers a letter to her husband from the year 1793, in which she apologizes for intercepting Scheele's letter. On three different levels, the *nécessaire* functions as an intriguing representation of Madame Lavoisier's multi-faceted character: her knowledge and scientific expertise (represented by the book), her powerful, independent femininity (represented by the travel chest), and her role as the bearer of truth (represented by the letter). Just as she describes herself as "wearing a woman's mask" (OXY 9), her travel chest is 'masked', too. Its outside is appealing, yet unspectacular, whereas its inside is complex and versatile. It holds a range of different objects alluding to Madame Lavoisier's diverse interests, abilities, and character traits: The different compartments in the travel chest contain sewing tools, which are typical for a housewife; furthermore, there are combs and bottles for perfumes, representing her femininity; lastly, one can find pens, ink, and "even a ruler crammed in a slit, like in a Swiss Army knife" (OXY 97). As Eva-Sabine Zehelein remarks, "the ruler […] elegantly illustrates the science wars, wrapped up in a book on the history of theater. 'Science-in-theatre' lives up to its most literal meaning" (Zehelein 2012, 81). The ruler, together with her pens and ink, represent Madame Lavoisier's scientific competence and her contributions to her husband's endeavor – they are her weapons of choice in the warlike conditions of science. The truth, *ergo* Madame Lavoisier's revelatory letter, can be found in a woman's 'private space' – a (stereo)typical, feminine object of daily use conceals Madame Lavoisier's biggest secret and simultaneously illustrates her immense power over her husband's as well as Scheele's and Priestley's careers.

The revelation of Madame Lavoisier's letter emphasizes the impact of the women in the play on two levels, both Madame Lavoisier's on her husband's career as well as Ulla Zorn's on the work of the retro-Nobel committee. The women in the play develop unorthodox strategies in order to succeed in the 'old boys' network'. As an expert of male domination in the world of science, Astrid Rosenqvist has anticipated the male members' rejection of Zorn's proficiency as a PhD student of history already before their first meeting. Therefore, she smuggles Ulla Zorn into the committee as Amanuensis in order to strategically utilize Zorn's expertise "in good time" (OXY 13). Similar to Madame Lavoisier, she navigates the course of the Nobel committee by selectively presenting – and withholding – information to her unsuspecting male counterparts.

While the ending of the play remains open, the audience learns that the committee decides to choose a pair of scientists, instead of a single scientist, for their retro-Nobel. With this decision, the committee members give up their search for an absolute answer and accept the fact that, even in science, there are questions which can only be answered in a *relational* context (cf. Gehrke 2008, 181). Similar to Diana's impact in *The Bourbaki Gambit*, the committee's decision is only possible because of Ulla Zorn's research – the natural scientists depend on the findings of a historian. In other words, if the meetings of the committee were a game – alluding to Pierre Bourdieu's aforementioned serious games of competition among men – Ulla Zorn would win it. Her presence and impact in the committee produces what Eva-Sabine Zehelein calls a "double confrontation: male-female and chemistry-history" (Zehelein 2012, 82), challenging the allegedly sharp boundaries between the natural sciences and the humanities. In this way, Djerassi and Hoffmann relativize the Two Cultures dichotomy and point towards the potential of productive discourse between the two supposedly opposing poles.

Yet, the pushing of boundaries does not end here. In both literary works, the Two Cultures are inextricably linked to gender. In *Oxygen*, aspects of the so-called private sphere, such as conversations between (married) couples, which the male scientists usually consider irrelevant for science and scientific practice or fail to even consider them, suddenly determine the outcome of the rewarding of the most prestigious prize in the world of science. The dominant masculine discourse on both time levels in *Oxygen* leads to no solution – Djerassi's male scientists in the play are portrayed as ignorant and surprisingly limited, once they leave their familiar scientific paths. To further emphasize the impact of the women, especially the 'Wives-in-Science', Djerassi and Hoffmann end the play with a monolog by Madame Lavoisier and let her share her thoughts about the impact of her joint discovery with her husband on the discipline of chemistry as a whole. Her final utterance – and play's closing word – is "Imagine!" (OXY 119), highlighting her passion for science and her agency within it. It is she – not her husband or one of the male committee members of 2001 – who returns to the stage alone to close the play and have the final word.

With *Oxygen*, Djerassi and Hoffmann contribute to the feminist movement of increasing the visibility of the scientific impact of the wives of scientists. As early as 2001, they represent these women as influential and powerful companions in their husbands' scientific endeavors. Although *The Bourbaki Gambit* and *Oxygen* are fictional

texts, they introduce elements of historical realities – the women's fictional *Lebenswelten* in their blend of fiction and reality make the play particularly intriguing. Djerassi thereby draws attention to the often- overlooked impact of women in science, both in 18th century science salons as well as to the influence of wives of successful scientists on the latters' careers. By implying that male scientific success is – at least partially – owed to women, Djerassi challenges the notion of 'the male genius' in science.

In doing so, Djerassi engages with the historicity of the natural sciences – something which the sciences as an academic discipline tend to neglect or dismiss as insignificant. In contrast, this kind of critical reflection is not only common but foundational in the humanities. Notably, Djerassi 'uses' literature – not the humanities – to explore this blind spot of the natural sciences. By creating fictional worlds, Djerassi's literary works offer the opportunity of reflecting upon past and present realities from the comfortable distance of a spectator. While prose allows readers to keep a certain degree of distance, the shift from prose to drama creates a greater sense of immediacy, especially when the play is performed. This immediacy plays a particularly significant role in the context of gender in Djerassi's literary works – an aspect which I will explore at a later point in this chapter.

Woman-in-Science, Mother-in-Science: Gender and Reproductive Technology in *Menachem's Seed* (1997) and *An Immaculate Misconception: Sex in an Age of Mechanical Reproduction* (1998)

In the late 1990s, Carl Djerassi sets out for a literary venture into reproductive technology – an issue which would occur in several of his literary works and one which seems like a natural choice, given the fact that a significant portion of his scientific career revolved around (female) fertility. With assisted reproductive technology – short ART, a fitting play with words, considering Djerassi's interest in science and art – he touches upon an issue relevant to many, assuming that "most people of theater-going age are convinced that they know the facts of reproductive life. But do they really?" (TMP 260). Beyond his pedagogical mission to educate his audience about the science behind reproductive technology, his third novel of his Science-in-Fiction tetralogy, *Menachem's Seed* (1998) and its dramatic adaptation *An Immaculate Misconception: Sex in an Age of Mechanical Reproduction* (1998), present a blend of ethical issues arising from the science of ART, such as: What makes a father a father? Can science and the personal ever be separated? What happens when scientists 'play God'?

Menachem's Seed tells a multi-layered, fascinating tale about sex, science, Judaism, and the complex political conflict of Israel and Palestine – embedded in a story about the ethical challenges of reproductive technology. With this novel, Djerassi moves away from his specific focus on the depiction of the tribal culture of the sciences – as in his two previous novels – and directs the reader's attention on the real-life consequences of a newly developed reproductive technique. Still, the novel includes gender-specific elements of scientific culture, for instance the treatment of the successful female scientist Melanie Laidlaw as the spouse of a scientific superstar. Djerassi thus examines a 20th century version of a 'Wife-in-Science' and further explores the gender-specific issues first raised in *The Bourbaki Gambit* and *Oxygen*. Notably, this novel serves as basis for his first Science-in-Theater play *An Immaculate Misconception*, which was produced in 1998. The intertextuality of the two works is particularly interesting to me – how does Djerassi's theatrical adaptation of *Menachem's Seed* emphasize gender-specific aspects of the culture of science?

Set mostly around the 1977 Kirchberg Conferences on Science and World Affairs in Austria – a fictional version of the famous Pugwash Conferences on Science and World Affairs – we observe Dr. Melanie Laidlaw, a former scientist in her thirties, who attends the conference in her role as the director of REPCON, a US-American foundation which supports innovative projects in reproductive technology. During the Kirchberg days, Laidlaw meets the nuclear engineer Menachem Dvir from Ben-Gurion University of the Negev, whose partly paralyzed wife has remained in Israel, and the two start an affair. They stay in touch and meet again in England a year later for the subsequent Kirchberg conference. In the meantime, Laidlaw has decided to use the recently developed reproductive method of ICSI – short for intracytoplasmic sperm injection – to fulfill her dream of becoming a mother. As a widow without a partner, she cannot warm up to the idea of using the sperm of an anonymous donor. After learning that ICSI requires only a single healthy sperm, Laidlaw decides to use the sperm of Dvir – without his consent – who is functionally infertile due to a severely low sperm count caused by radiation exposure. When she meets Dvir in London, Laidlaw keeps the condom with Menachem's sperm, travels to Belgium for the ICSI insemination and gets pregnant with Dvir's son. Even though she never tells Dvir about her pregnancy, it is crucial to her that her son is Jewish like his absent father – thus, Laidlaw converts to Judaism before Adam's birth. A few months later, Laidlaw and Dvir cross paths again when Dvir applies for a REPCON research grant. Laidlaw then reconsiders her decision to withhold Adam's existence from his father and sends Dvir a letter in which she tells him about his son.

Of all four novels of Djerassi's Science-in-Fiction tetralogy, *Menachem's Seed* puts the least focus on the actual science described in the novel. Its focus lies much more on the implications of reproductive technology for women in contrast to the androcentric focus in contraceptive research – and the conflicts arising from this discrepancy. At the beginning of the novel, the reader observes a rather heated exchange between reproductive biologist Felix Frankenthaler and his female seatmate at a fundraiser at Brandeis University about the neglect of women-related aspects in contraception. The woman quite directly exclaims: "Reproductive biology? You must mean *female* reproductive biology. Why don't you men ever pay attention to your role in reproduction?" (MS 11). As his defense, Frankenthaler points out, he has "made [his] reputation in the fallopian tube" (ibid.), inadvertently stressing how female bodies have functioned as means for his recognition and fame in science. In an attempt

to position himself as a supporter of women, he tells his interlocutor about the recent research of one of his postdocs: "One of my brightest postdocs […] is trying to design nitric oxide-releasing substances that might be applied to the penis. As a way of treating impotence." (MS 13) When the woman accuses Frankenthaler of a fixation on male virility, he quite aggressively responds: "If you can't get it up, […] you can't get it in. Only then do we start worrying about birth control." (ibid.) Unintentionally – and admittedly, in a quite entertaining manner – Frankenthaler reveals his utterly androcentric perspective as male scientist on reproductive science. He naively cites the biological fact that natural reproduction requires penetrative discourse as an excuse for his penile fixation and ignorance of female-focused research regarding contraception.

Throughout the novel, its didactic approach to gender-specific issues in reproductive technology unfolds mostly through conversations between Frankenthaler and Laidlaw, each representing the perspective of their respective gender. Like the woman at the fundraiser, Laidlaw criticizes Frankenthaler and his male colleagues for their exclusive focus on helping impotent men: "That's all you men ever think of. Why don't you work on prevention rather than performance, for a change? In other words, pay some attention to contraception." (MS 61) As Laidlaw points out possible ways of developing male contraception, such as analogs of luteinizing hormone-releasing hormones, Frankenthaler quickly dismisses this suggestion due to its impracticability and its side effects. Laidlaw debunks this hypocrisy in contraceptive research by remarking: "You poor men: having to take a pill all the time, like women." (MS 62)

Laidlaw highlights a common point of criticism regarding contraception which is still highly relevant today: women are expected to be the part of heterosexual couples who assumes the burden of contraception and have to accept major side effects of hormonal birth control due to the lack of reasonable contraceptive alternatives for men. The novel criticizes the phallocentrism of male researchers in reproductive technology whose scientific focus lies on the development of methods to cure impotence – the patriarchal epitome of masculine weakness – instead of advancing the research on contraceptive alternatives to the pill. Laidlaw pointedly remarks: "All the reproductive fraternity is interested in these days seems to be treatment of infertility." (MS 61) *Menachem's Seed* thus not only criticizes the men in Djerassi's science tribe for ignoring women-specific aspects in their research. As a former scientist himself who significantly contributed to the development of the birth control pill – and hereby to the sexual liberation of women – Djerassi implicitly looks at his own scientific

achievements more favorably than at those of his (male) colleagues. Yet, from a 21st century perspective, he also relativizes the gender-specific implications of his biggest scientific achievement as he, too, focused exclusively on female contraception – like the vast majority of his tribe, he did not advance the scientific research on methods to release women of the sole responsibility of birth control.

Menachem's Seed challenges social norms regarding contraception and exposes the androcentric lens through which (mostly male) scientists in contraceptive biology choose their research topics. Beyond this criticism of the sciences at an institutional level, the novel sheds light on the gender-specific struggle of an individual female scientist, Melanie Laidlaw – particularly through her portrayal as wife to the esteemed scientist Justin Laidlaw, which I will investigate in the following section.

Sleeping her way to the top? Melanie Laidlaw's realities as wife of a successful scientist

Menachem's Seed explores the path of a female scientist who marries her PhD advisor, playing on the common stereotype of women using their sexual power to advance their professional success. In an inner monolog, Laidlaw reflects upon her relationship with her husband, which is inextricably connected to her scientific career. She met Justin Laidlaw, a reputable biochemist in his late thirties at Columbia University in graduate school when she joined his lab group in her mid-twenties. His notable reputation did not prevent him from displaying morally questionable behavior – he initiated their romantic relationship by suggesting his PhD student Melanie Laidlaw to "join him for a bite" off-campus (MS 36). In this way, Justin Laidlaw displays an ignorance – at best, a lack of awareness – of the power relations between Melanie and him. Instead, his focus was on protecting his reputation: "Justin didn't want anyone to know that he had a 'relationship' with a graduate student, even a consenting adult, and we met very discreetly in his apartment." (MS 37) Even in retrospect, Laidlaw does not consider her husband's behavior as problematic or at least dubious – very much the opposite, she appears to hold him to a higher moral standard than his colleagues. Here, the text is a testament to its time: the 1970s, in which the plot is set – and even the 1990s, when the novel was written – lacked an awareness of gender-specific power relations, which were fostered by, for instance, the global *#MeToo* movement in 2017 and the years that followed.

Ultimately, Justin Laidlaw proposed marriage to his mentee – the two married the day after Laidlaw's PhD defense. She comments:

> Justin suggested that we got married the day after I got my PhD and while this was an incentive for both mentor and disciple to expedite matters, our engagement still spanned nearly two semesters, which, in retrospect, were collegial purgatory. A lab group, and especially one as small as Justin's, is very intimate. You only realize the extent of that intimacy when it suddenly evaporates, and evaporate it did as the first glimmer of light reflected from my engagement ring. (MS 38 f.)

Justin's self-centered suggestion to marry only one day after Melanie's dissertation defense not only puts her under immense pressure to juggle two significant events more or less simultaneously, it diminishes her scientific achievement. He does not let his wife have *her* moment in her scientific career after having successfully completed graduate school, further stressing his egocentricity and the hierarchical structure of their relationship. Even more, the novel challenges the notion of the alleged advancement of the careers of women through romantic relationships with influential men. As the professor's fiancée, Melanie Laidlaw faced exclusion from all collegial aspects at her workplace as graduate student: "I learned very quickly that the person sharing pillow talk with the professor is excluded from gossip or even banter in the lab." (MS 39). As we have learned in *Cantor's Dilemma*, gossip can be a crucial element in the culture of the sciences, so Laidlaw's lack of inclusion in her research team accounts for more than missing out on collegial amusement at her workplace – it can result in professional disadvantages within the science tribe.

In weighing the pros and cons of being engaged to her PhD advisor, Laidlaw remarks matter-of-factly that there was "really only one [pro]: ad libitum sex" (MS 39) – the cons, on the other hand, were "numerous, and much more enduring" (ibid.). After her graduation, she continued to work as Justin Laidlaw's underling in the role of his research associate. Nonetheless, she describes the nature of their marriage as deep "companionship" as "it had started in the lab and persisted there as well as in the home" (MS 40). Regarding their professional relationship, Laidlaw looks back on her work with her husband as a favorable arrangement: "I worked with my husband […] without feeling that the shadow of his reputation in any way diminished me. It was this feeling of mutual respect that was the basis of our profound friendship." (ibid.)

While her account of their professional relationship certainly creates the image of a mutually beneficial team, Melanie Laidlaw ignores a significant detail – her whole existence as a scientist depended on her husband. She describes herself as the "professor's surrogate" who gave her husband's lectures when he was absent and who "always tagged along" when her husband attended international congresses, NATO workshops, and award lectures (ibid.). Her choice of words emphasizes the level of

her reliance on her husband. Compared to the other professors' wives, she nonetheless considered herself superior, as she was "the youngest and frequently, professionally, also the most advanced woman" (MS 41). Looking back on it, she admits that she "ignored that this was so only because the majority of the other spouses belonged to the earlier generation, when wives offered domestic rather than laboratory support" (ibid.). Laidlaw's rude awakening came after her husband's unexpected death – an event which drastically transformed both her professional and her private life. What she considered an incentive – being the wife of a hugely successful scientist – suddenly became her biggest disadvantage.

Quite naively, Laidlaw initially hoped that after her husband's death, her contract with Columbia University as research associate would be transformed into a tenure-track position. Yet, as she had to learn, the majority of the faculty only viewed her as Justin Laidlaw's wife – even though she, a successful scientist, was more than eligible to receive tenure (cf. MS 41). To continue her scientific work and secure the funding of her research, she needed a professorship. Ultimately, Laidlaw recalls: "And when Justin's grant money ran out, I found myself for all practical purposes on the street." (MS 42). In other words, the sciences as an academic institution had no space for the scientist wife of a deceased scientist and the rigid culture of the sciences offered no room for unconventional career paths. Laidlaw's inner monolog about her time in the sciences functions as cautionary tale about the dangers of female dependency on men – her romantic relationship with her advisor has led to a gradual loss of her professional identity. Even though she "foremost wished to establish a scientific name for [her]self" (MS 40), she eventually disappeared in the shadow of her scientific big shot husband. Without realizing it, she sacrificed her own scientific career when she became Mrs. Laidlaw – even her academic publications became invisible as the surname "Laidlaw" was exclusively linked to Justin Laidlaw (cf. MS 41 f.).

At first glance, the mélange of romantic and professional partnerships of the Melanie and Justin Laidlaw might appear like a scientific fairytale – yet, at the same time, it emphasizes the imbalance of power relations. In this team, financial and professional security is unilateral as it entirely depends on the husband's scientific success. In other words, without the husband, the wife is nothing. Even though Justin Laidlaw's career immensely profited from his wife's contributions, he – the alleged genius – apparently never even considered to offer her financial and professional security in exchange. Melanie Laidlaw's experience mirrors the realities of countless women to whom divorce or the death of the partner more often than not results in a significant drop of household income – at times even poverty – caused by financial

dependency of the women in marriage[19]. In Laidlaw's case, her loss was not only of financial nature but also resulted in the decline of her own professional career. Remarkably, if she and not her husband had died, his career would not have been affected.

Eventually, Laidlaw faced the decision to either apply for a tenure-track position outside of her department – and more or less start over – or leave academia altogether. Not wanting to give up her privileges, she opted for a position as director of the REPCON foundation, an organization which funds research in reproductive biology. This job appears to have "solved all [her] problems", as it gave her "professional satisfaction, financial independence, and no tenure hassles" while simultaneously "being courted assiduously by all the cocks of the academic walk" (MS 43). Remarkably, despite her humbling experience as the professor's widow, she still seeks the attention of male scientists. Her professional success once more depends on the support of (male) scientists – this time, it was her friend Felix Frankenthaler who informed her about the vacant position at the foundation. Nonetheless, at REPCON, she finally holds real power over the work of (mostly male) scientists, which can be understood as compensation for her previous loss in the sciences.

Yet, what her position as director of the REPCON foundation cannot fulfill her desire to become a mother. As the following section of this chapter will explore, Melanie Laidlaw's newly gained professional independence expands to an increased level of self-determination in her personal life as well, including her sexuality, leading her to tread the path of single-parenthood.

Independent sexuality, independent motherhood

Unlike Djerassi's previous Science-in-Fiction novels, *Menachem's Seed* draws a specific focus on sexuality – the plot revolves around Laidlaw and Dvir's sexual relationship and the reader observes the two scientists in most intimate settings. Connecting sexuality with the natural sciences relativizes the common (mis)conception of scientists as asexual beings solely focused on their research and thereby, at least to a certain extent, deconstructs the notion of the aforementioned 'unworldliness' of the

[19] As economists Guyonne Kalb and Barbara Broadway from the University of Melbourne have shown in their 2022 study, "[w]hen a heterosexual relationship breaks down, women are at a much higher risk of falling into poverty than men" (Kalb et al 2022). Furthermore, Kalb and Broadway have found that "on average women's household income decreases by almost 30%" while, in comparison, the men's income was reduced by only 5% on average (ibid.).

scientist. Laidlaw is presented as a sexual individual, unapologetically aiming for the satisfaction of her desires. In her sexuality, Laidlaw expresses her agency and self-determination – most significantly through masturbation, a sexual activity not requiring a (male) partner.

In an extensive monolog, Laidlaw reflects upon her journey as "the ultimate masturbation autodidact" (MS 56). With a typically scientific curiosity and ambition, Laidlaw further develops her masturbation skills to increase her sexual pleasure. Ultimately, after her discovery of Kegel exercises, she has perfected the art of masturbation so she can climax unnoticedly even in professional meetings (cf. MS 58 f.). To Laidlaw, "masturbation is far more pleasurable than sex with the wrong person" (MS 57) – but even when she is with a sexual partner, she does not relinquish masturbation as it is "extolled in [her] personal Kamasutra" (ibid.). Against the background that female masturbation is – still nowadays – a taboo, Djerassi breaks a significant gender boundary in his novel with Laidlaw's elaborate account of her experiences with masturbation. Most significantly, this form of autoeroticism emphasizes Laidlaw's increasing independence: first, only in the form of masturbation, later in – more or less – independently becoming a mother.

In the course of the novel, Laidlaw's urge for self-determination and independence from men culminates in her desire to raise a child on her own terms. Her exchanges with her friend Frankenthaler reveal the feminist dimension of her vision of motherhood as a single woman:

> Take a professionally and financially independent single woman, whose biological clock is ticking. Or maybe the alarm has already started to ring. Let's assume she has all the attributes of a good mother, but she hasn't found the right mate for matrimony. Does that mean she cannot be allowed to have a child unless she's willing to run out and commit herself to someone she wouldn't otherwise consider? Or what if she's found the right man, but he isn't available for family commitments? Let's say he's married. And can't get divorced […]. (MS 100)

With these allegedly fictional scenarios – clearly representing her own experiences – Laidlaw highlights a struggle shared by many women, particularly professionally successful women, for whom motherhood becomes less attainable due to their non-traditional lifestyles. To women like Laidlaw, methods of reproductive technology offer the opportunity of becoming a mother, even without a romantic relationship as a prerequisite. By broaching this specifically feminist issue in his novel, Djerassi not only adds to the feminist discourse revolving around (alternative models of) motherhood, he expands the scientific aspect of reproductive technology with the possible real-life consequences of the methods developed in the shielded spaces of

laboratories. Yet, the feminist dimension of independent motherhood in the novel should not be romanticized. In the case of Melanie Laidlaw, her desire for independent motherhood marks the beginning of a sequence of highly problematic actions which ultimately results in the utter disregard of the rights of her child's biological father.

Laidlaw's independence results in an extreme urge to control her life, even on an interpersonal level. She rigidly plans her encounter with Dvir in London and does not leave even the smallest detail to chance. In an e-mail to Dvir, she not only gives him clear directions on how to reach the hotel where she has booked a luxurious room for their encounter – her vision of her romantic sojourn in London goes so far as to elaborately lay out to Dvir: "On one of our evenings, we will walk arm in arm all the way to Regent's Park along one of the quays lined with houseboats. We'll behave openly like lovers, because I cannot imagine that anyone knowing you or me would be walking there." (MS 116) Even the choice of the hotel room is intentional – Laidlaw has stayed in room 17 of The Colonnade Hotel before and has had the plan to fulfill her sexual fantasies in this room: "[…] I promised myself that if I ever returned to London with a man, we'd stay here." (MS 117) It becomes clear that Dvir is a means to fulfill Laidlaw's various fantasies – her fantasy of a romantic stroll through London, her sexual fantasy of an orgasm during the opera (cf. MS 88 ff.), and her ultimate fantasy, having a child – or more precisely, having Dvir's child.

As her conversations with Frankenthaler reveal, using Menachem's sperm to become pregnant without his knowledge is an elaborate plan, not a spontaneous idea (cf. MS 100). Not even her interrogation of Dvir about his desire to become a father – in which he unmistakably states that fatherhood in his "present circumstances" would be "too difficult" (MS 142) – does not stop Laidlaw from continuing her plan. On the contrary, it culminates in her decision to 'steal' Dvir's sperm – the peak of Laidlaw's manipulation and corruption. Before yet another sexual encounter, she fabricates the lie of having a vaginal yeast infection, so that Dvir – who, due to his functional infertility, usually does not use condoms – would wear a condom during intercourse. Even when Dvir appears irritated about the unusual condom – which is in fact a seminal pouch made of medical plastic sealed with a rubber band to avoid the sperm of running out of the pouch – Laidlaw tells him the lie that the rubber band has the purpose of increasing her sexual pleasure (cf. MS 144). Laidlaw's manipulative behavior peaks in her first faked orgasm (cf. ibid.), emphasizing the level of orchestration of this sexual intercourse.

Becoming a mother on her own terms – even if this entails the utter disregard of the needs of everyone else involved – ultimately turns into Laidlaw's obsession. In

a conversation with Frankenthaler, Laidlaw remarks: "Earlier on, […] you asked if motherhood was such an attractive profession. I'm not so sure it has to be 'attractive'; for some people, I think it's an obsession." (MS 151). Her level of obsession becomes especially clear when Laidlaw argues for choosing Dvir's sperm over that of an anonymous sperm donor. In an inner monolog, Laidlaw figures it would not be "as pleasurable" and that she "want[s] to know the father of any child of [hers]. Not just have a visual image, but also a mental one." (MS 151). Laidlaw uses this very mental image of Dvir to legitimize her highly problematic decisions. She continues:

> Why Menachem? It all fell into place in Brussels at the moment the needle penetrated that unknown woman's egg when I thought about his presence, his eyes especially. It's not the color of his pupils or the shape of his eyes nor the feminine long lashes in his very male face, but their pellucid luminosity that transmits his true virility. True virility. Although he has a strong, muscular body […]; when I think of Menachem's virility I feel something else: virility in character, in intelligence, in curiosity, in the absence of pretense. These are all features I wish to see in my son. If I were to bear Menachem's child, it would be bound to be a boy. (MS 152)

Even though Laidlaw promotes an unconventional image of motherhood for herself, her image of masculinity – or as she calls it, virility – conforms to highly traditional archetypical representations of manhood. To her, Dvir displays a high level of *masculine* strength, linking Dvir's appealing characteristics directly to gender – which she also envisions for her son. While this can be read as peak female self-determination and control – she chooses the man she finds most attractive to father her child, even without his consent – it can also be understood as madwoman behavior. Laidlaw's monolog stresses her irrationality caused by sexual attraction, reproducing the common patriarchal trope of the madwoman who seduces a man into his downfall. In this way, the novel reproduces a patriarchal, *male-defined* femininity.

In the novel, the concept of obsession is not female-specific per se, yet it is presented differently according to gender. For the men, obsession plays a role in their profession – for instance, regarding Justin Laidlaw's level of obsession with his scientific work (cf. MS, 36), and Frankenthaler's fixation on the male part of human reproduction (cf. MS 13). As a woman, however, Laidlaw's obsession is directed towards motherhood, alluding to the patriarchal notion of motherhood as the ultimate female *raison d'être*. Still, without ignoring this deeply problematic depiction, there is a feminist dimension to this as well: in her limited agency as a woman in science, she chooses motherhood to exercise ultimate control – and as her conversations with Frankenthaler reveals, she does so with full awareness.

In her journey to motherhood, Laidlaw lives out a level of independence she never attained in science due to her gender. In her self-determination, her sexuality, and her struggle for control, Laidlaw wields power and qualities typically exclusive to men. Noticeably, she can only unfold these qualities through deceptive behavior. This of course raises the question whether such behavior is a necessary response to the patriarchal circumstances of science – or whether the novel depicts her, a woman, as devious in nature. While the text offers no definitive answer, it admittedly reproduces notions of a historical understanding of womanhood as linked to a lack of sanity, potentially resulting in a misogynist reading of the novel.

In any case, the novel questions how single-parenthood can truly be independent – in Laidlaw's case, the fulfillment of her vision of feminist motherhood results in the violation of Dvir's rights. The obvious solution – using the sperm of an anonymous donor – would not meet her needs and her concept of motherhood. With this dilemma, the novel highlights the ethical boundaries and the real-life consequences of reproductive technology. What might appear as a scientific breakthrough in the laboratory can potentially have an unforeseeable impact on individuals and society at large. Eventually, the novel does not choose sides and refrains from a moral catharsis of exposing Laidlaw's ethical wrongdoings. Instead, it leaves the ultimate verdict to the reader.

In his theatrical adaptation of the novel, *An Immaculate Misconception*: *Sex in the Age of Mechanical Reproduction* Djerassi further explores the ethical responsibility of scientists in reproductive technology. In his first Science-in-Theater play, unlike in the novel, Melanie Laidlaw performs the ICSI experiment on herself and is assisted by Felix Frankenthaler. In the following section of my thesis, I will focus on the representation of the female scientist Laidlaw who chooses to bend the existing scientific code of conduct to her own advantage in order to prevail in the male-dominated space of the natural sciences.

"Testosterone-tinted glasses" versus "estrogen-etched view":
Gender-specific notions of doing science in
An Immaculate Misconception: Sex in the Age of Mechanical Reproduction *(1998)*

In Djerassi's critically acclaimed first play, which premiered at the world-famous Edinburgh Fringe Festival in 1998, reproductive biologist Dr. Melanie Laidlaw, together with fertility specialist Dr. Felix Frankenthaler, develops the groundbreaking

reproductive technology ICSI. Laidlaw decides to perform the first ICSI experiment on herself by using her own egg and the sperm of her lover Dr. Menachem Dvir, an Israeli nuclear engineer who is practically infertile due to a radiation accident. Laidlaw and Dvir, who is married at the time, have met briefly at an academic conference where they started an affair. During another encounter months later, Laidlaw steals Dvir's sperm by keeping his used condom and later fertilizes her own egg with his sperm using her newly developed method of ICSI. Laidlaw's collaborator Frankenthaler finds out that she has used the sperm of her practically infertile lover when he sees the poor quality of the sperm under the microscope and spontaneously decides to use his own sperm to fertilize another one of Laidlaw's eggs behind her back when she is not in the laboratory. Both eggs, the one fertilized with Dvir's sperm as well as the one fertilized with Frankenthaler's are transferred into Laidlaw's uterus and she becomes pregnant. Laidlaw later gives birth to her son Adam and raises him with Dvir, who became divorced in the meantime, only to find out about Frankenthaler's intervention then. The play ends with an epilogue in which 18-year-old Adam opens an envelope with the results of a DNA test to determine whether Dvir is his biological father. The results of the test are not revealed – every spectator, or reader, respectively, needs to decide for her-/himself.

In comparison with the novel, the play highlights the struggle of the (in)compatibility of motherhood and a scientific career. Given that the culture of science has been shaped by men and for men, how does a female scientist handle the existing code of conduct? What happens when a (female) scientist disregards the unwritten rulebook in science? To address these questions, it is necessary to explore Laidlaw's way of 'doing science', as she ultimately chooses to ignore its dominant code of conduct by performing the ICSI experiment on herself. Although she initially conforms to the cultural norms of Djerassi's (masculine) tribe of scientists, the issue of motherhood upends these standards.

The research team Laidlaw/Frankenthaler: Ambitious and dysfunctional

The play portrays Melanie Laidlaw and Felix Frankenthaler as typical representatives of Djerassi's science tribe – driven by a desire for priority and professional success, the two researchers are extremely ambitious and brutally competitive. Similar to the scientists in Djerassi's other literary works, their striving for personal success outweighs the positive effect of their scientific discovery for the scientific collective –

and for society. In a conversation with Laidlaw about the potential outcome of their experiment, Frankenthaler assesses his scientific success, and ultimately, his potential fame and recognition as more significant than developing a scientific method to help numerous involuntarily childless parents: "[T]hat one publication will count for more than the infertile patients I'll ever convert into parents." (AIM 1.2[20]). Laidlaw expresses a particular interest in fame and recognition by her peers as well: "And if that works […] I'll even become famous. […] We'll become famous!" (ibid.) Contrary to the common perception of 'science for science's sake' – the notion that scientists are motivated by idealism, a thirst for knowledge, and a desire to improve the world, as I have previously explored in this thesis – Djerassi chooses a different representation of a 'typical' scientist. For Laidlaw and Frankenthaler, fame and recognition by their scientific peers play a much greater role than scientific idealism.

Ultimately, the self-centeredness and the individual agendas of the two scientists threaten the positive outcome of their experiment. Like in Djerassi's previous literary works, the nature of the relationship of the research team points towards the weaknesses of the culture of science. Due to their heightened levels of egocentricity, Laidlaw and Frankenthaler display an utter lack of communicative skills and fail to agree on terms and conditions for their scientific work. At first, the research team Laidlaw/Frankenthaler appear euphoric about their shared scientific project, even about working in a team. In one of her e-mails to Dvir, Laidlaw claims she has changed from "the typical ivory tower scientist who wants to make her own reputation alone" to a scientist who is "ready for teamwork" (AIM 1.2). Laidlaw, who apparently is accustomed to relying on herself in her research, begins to truly enjoy professional collaboration

Laidlaw's following correspondence with Dvir mirrors how she increasingly loses herself in her scientific project. In her first e-mails, Laidlaw focuses entirely on Dvir but the more her research gains momentum – and the closer she reaches her scientific breakthrough – the more her e-mails are focused on her research. In a later e-mail to Dvir, she remains unusually short-spoken – her main focus appears to be on working in the lab with Frankenthaler. It appears that the more successful her scientific project, the more monological and egocentric – and 'typical' scientist – she becomes. Eventually, Laidlaw proves unable to sustain productive teamwork, contrary to her initial statements in favor of working together. After all, her focus lies on increasing

[20] In this thesis, I am referring to the original version of the play from 1998. This is particularly important to point out as over the course of the subsequent years after its initial publication, Djerassi repeatedly revised crucial aspects of the play, including the dramatis personae, the ending, etc.

her own benefit, both professionally and personally. She regards the experiment as her property, with Frankenthaler acting merely as a vehicle to her success as she needs a fertility expert for the success of her project: "I told you, it's my experiment!" (AIM 1.4) Ironically, the very element of teamwork ultimately threatens the project as a whole as her collaborator Frankenthaler emerges as its greatest source of uncertainty (cf. Gehrke 2008, 177).

The self-centeredness of both scientists – culminating in the manipulation of one another – becomes particularly clear in the process of determining the order of names in the publication of their experiment as both scientists mask their personal interests as common practices in the culture of science. Frankenthaler, apparently as a last resort to raise his impact in their research project, suggests to go with the common practice of putting their names in an alphabetical order – knowing that his name would then appear first in their publication (cf. AIM 2.10). Once more, Djerassi points towards the significance of the order of names in academic publications, a central aspect in the culture of science which may appear secondary to outsiders, as I have already shown in my analysis of *Cantor's Dilemma* (1989). By disguising his desire to be mentioned first in their publication as the normality of publication practice in science, Frankenthaler seeks to advance his own scientific career – even though he only functioned as technical assistance to the experiment, while Laidlaw actually developed the experiment itself.

Despite their shared desire to revolutionize reproductive technology – and become famous in the process –, the relationship between Laidlaw and Frankenthaler comes to be more and more dysfunctional, resulting not only in a lack of trust between each other but ultimately, in betrayal. The initially amicable research team eventually fails due their opposing viewpoints on how to 'do science' – and the issue of gender lies at the heart of this problem.

Misogyny, mad-scientist-behavior, and total corruption in science

Throughout the play, Frankenthaler repeatedly criticizes Laidlaw for mixing science and her personal life, expressing a specific interpretation of the code of conduct in science. To him, science and the scientific endeavor are inherently rational, leaving no room for emotionality or personal interest in the matter. Therefore, Laidlaw's decision to use her own eggs in her experiment causes a major disagreement between them. Frankenthaler questions her judgment as a scientist: "It's bad science… adding an

emotional variable. It's crazy." (AIM 1.5) Instead, the "first attempt at ICSI fertilization must be science … it can't be romance" (ibid.), revealing Frankenthaler's utterly misogynist attitude. Using the binary opposition of 'science' vs. 'romance', Frankenthaler draws a gender-specific connection – he the male scientist, represents reason while he views Laidlaw, the female scientist, as unable to differentiate between reason and romantic interests, calling her behavior "crazy" (ibid.). Frankenthaler expects Laidlaw to do science the 'normal' way – that is, in the manner it has been practiced by men over centuries. In other words, Frankenthaler expects Laidlaw to conform to the male-dominated code of conduct of science. He deems any deviation from this ideal of (alleged) objectivity "crazy" (ibid.) – a term with a rich history of patronizing women. Ironically, Frankenthaler is convinced of the possibility of separating science from emotions and repeatedly points towards the alleged objectivity of science, without realizing his own subjective, gender-specific biases towards his female research partner.

Unfazed by Frankenthaler's patronizing remarks, Laidlaw refers to the "honorable tradition" of self-experimentation in medicine, emphasizing the many positive results, both scientifically and personally, of the experiment (ibid.). Laidlaw intends to hit two birds with one stone – her experiment has the potential of leading to an outstanding scientific breakthrough while simultaneously fulfilling her dream of motherhood. Frankenthaler's legitimate concerns for the possible negative outcome of the experiment, for instance the possibility of a failed experiment or "even worse, a genetically damaged [baby]" (ibid.), are dismissed by Laidlaw. Regardless of the fact that her experiment (and its outcome) is ethically questionable, her determination to perform the experiment according to *her* plan trumps any objections on Frankenthaler's side.

Absurdly, only mere minutes after lecturing Laidlaw on the alleged incompatibility of science and one's personal life, he acts contrary to his own advice to Laidlaw by adding a *very* personal variable to the experiment himself. In order to secure the success of their experiment, Frankenthaler goes so far as to using his own sperm to fertilize the egg of Laidlaw without informing her about this violation. Frankenthaler hereby not only crosses multiple ethical boundaries – he falsifies his own claim that science is an entirely rational discipline and that self-experimentation in reproductive technology should be avoided. Even worse, his (male) ego apparently cannot bear the fact that his scientific success would be based on the sperm of a more or less infertile man – a man with "crummy sperm" (ibid.) and "incomplete manhood" (AIM 2.7). When he views his own healthy and thus rapidly moving sperm on the

screen attached to the microscope, he mumbles to himself "Now that's better!" (AIM 1.6) and appears satisfied and pleased, both with the condition of his sperm as well as with his decision to use it for the ICSI experiment. Clearly, Frankenthaler's intervention has also been motivated by vanity, jealousy, and a thirst for power.

In a further twist, Djerassi portrays the behavior of the male scientist Frankenthaler as archetypically masculine dominance behavior, motivated by jealousy of another man. In a conversation with Menachem Dvir, Laidlaw's later partner, Frankenthaler admits to being jealous of the "mysterious man" (AIM 2.10) whom Laidlaw has chosen as the father of the first ICSI baby. In other words, another man's sperm not only poses a threat to Frankenthaler's professional success, it also challenges his own masculinity. Clearly, the significance of patriliny in the culture of the sciences takes on a literal role here as well. Thus, in order to regain control of their scientific project and to assert himself as ultimate father, Frankenthaler fertilizes Laidlaw's egg using his own sperm without her consent. He thereby conforms to the 'mad scientist' trope, a self-centered male researcher who is willing to resort to drastic, unethical measures to secure the success of his scientific endeavor. Frankenthaler's mad-scientist-behavior leads to total corruption and the violation of Laidlaw's rights.

When confronted with his action by Laidlaw, Frankenthaler justifies it as a rational reaction to Laidlaw's decision of mixing science and her personal life:

> One minute before performing the very first injection … in history … you confronted me on the monitor with a sperm sample that only a naïve optimist or a love-sick girl would consider suitable for ICSI. My injection was just as much for your personal benefit as for our success. Why aren't you willing to accept it as an insurance policy? (AIM 2.11)

Frankenthaler is entirely ignorant of his violation of Laidlaw's private space and patronizes her by calling her a "love-sick girl" (ibid.). He views Laidlaw as incapable of reaching sensible decisions by herself and considers himself to be in the position to decide for her – without consulting with her first – and justifies his intrusive behavior with her alleged naivety. Even when Laidlaw accuses him of '[r]ape and lack of informed consent" (ibid.), he refuses to take responsibility for his actions.

Frankenthaler uncritically and dogmatically reproduces his beliefs and assumptions about science and scientists. To him, there is one 'right' manner to do science, one that excludes dialog or an exchange of ideas, even with those whose lives are directly affected by its consequences. Masked as concern for the outcome of their possibly groundbreaking research, Frankenthaler persists on the normality of the scientific code of conduct. Laidlaw becomes the proverbial guinea pig in his laboratory

– her own agenda, both scientific and personal, are entirely ignored by him. In this context, Djerassi's choice of name is quite telling: with 'Frankenthaler' he quite obviously alludes to Mary Shelley's (in)famous *Frankenstein* (1818), further stressing the mad-scientist-behavior of Felix Frankenthaler.

Even though Laidlaw is the victim of Frankenthaler's violation of her personal rights, she also exhibits highly unethical behavior. Due to her unwillingness to accept the sperm of an anonymous sperm donor as she wants "a potential father" (AIM 1.3), she uses Dvir's sperm without his consent. After another sexual encounter, she takes his used condom and stores it in a flask containing liquid oxygen in order to later use Dvir's semen for the insemination of her eggs (cf. AIM, 1.4). In a feeble attempt to justify her violation of Dvir's rights, Laidlaw claims that one cannot steal something "that the owner considers worthless" (AIM, 2.7). Even more, she patronizes Dvir and claims to know his needs better than he does himself: "Deep down, I know he'd like to be a father." (AIM 1.5)

Much to Laidlaw's advantage, Dvir's happiness over his unexpected fatherhood – which he deems "the greatest gift anyone could ever give [him]" (AIM 2.9) – outweighs his anger over Laidlaw's unethical actions, ultimately drawing more attention on Frankenthaler's similarly problematic deed. Surprisingly, Laidlaw ultimately achieves all she desires: scientific success, a child – and Menachem Dvir as her child's father *and* as her husband. Remarkably, the deeply troubling violation of Dvir's reproductive rights does not lead to any legal or personal repercussions for Laidlaw. Thus, at no point does she doubt her decision making.

Laidlaw's hubris in doing science is typical for a representative of Djerassi's science tribe. Instead of securing the experiment's success by choosing the most reliable and secure parameters, for instance healthy sperm, she chooses her lover's low-quality sperm – without his consent – in order to fulfill her personal dream of motherhood. She cherishes the illusion that with ICSI she can "consider everything" (AIM 1.5), emphasizing the degree of power the method of ICSI provides to her. She thereby fails to realize her violation of Dvir's reproductive rights and, given the fact that she is developing an entirely new reproductive technique, the potential threat to the health of her unborn child. With this degree of egocentricity, she does not differ from her male colleague Frankenthaler. In *An Immaculate Misconception*, Djerassi presents his scientists as corrupt and unscrupulously focused on maximizing their own benefit, regardless of their gender. Still, as it turns out, Laidlaw has one specific advantage over Frankenthaler: her experience of becoming a mother.

Ultimately, Laidlaw shifts from being a self-centered scientist – a typical representative of Djerassi's 'science tribe'– to a parent whose interest is not solely her success in the scientific community. To her, the experience of motherhood results in adjusting her priorities: "I'm a parent before I'm a scientist." (AIM 2.11) Motherhood broadens her perspective – her life outside the laboratory offer her a more nuanced view on life itself, and of doing science in particular. This becomes especially clear when she reminds Frankenthaler of the actual product of their scientific endeavor: "We're dealing with life, not a journal article." (AIM 2.7)

Only when she becomes a mother does she realize that her scientific project – and even her desire of becoming a mother – are endeavors in which she has failed to take into account the actual outcome of reproductive technology: the child himself. Djerassi points towards this aspect with the subtitle of the play, "Sex in Age of Mechanical Reproduction", an allusion to Walter Benjamin's essay of 1935 "Art in Age of Mechanical Reproduction". The subtitle not only refers to "the impending separation of sex (in bed) and fertilization (under the microscope)" (Djerassi 2005) but also draws attention to the product of reproductive technology, namely the child:

> […] [I]n our preoccupation to conceive, we often forget the product of all the technologies we utilize, namely the resulting child. Benjamin argues, "The technique of reproduction detaches the reproduced object from the domain of tradition." All the reader has to do is to substitute "child" for "reproduced object" in order to land right in the middle of the ethical thicket that reproductive technologists invariably face: they support heroic efforts by many couples to overcome certain biological hurdles that may very well harm rather than benefit the "reproduced object". (ibid.)

Djerassi highlights how scientific success in the field of reproductive technology potentially comes at a price: the well-being of a human life. The play shows how both scientists fail to consider the implications of their research on the human life created by their experiment. Only through the experience of motherhood does Laidlaw begin to realize the ethical issues of her experiment. Interestingly, the very aspect that initially appears to interfere with her success in the scientific world ultimately becomes her greatest advantage.

Laidlaw's character development becomes even more apparent when contrasted with Frankenthaler's lack of development. Throughout the play, he refuses to challenge his egocentric, one-dimensional perspective on doing science. Regarding the possibly complicated issue of paternity of Laidlaw's son Adam, Frankenthaler obstinately claims that biological paternity is "the only paternity that counts" (AIM

2.11). Apart from emphasizing the degree to which Frankenthaler's worldview remains to be shaped by clear-cut, rigid rules, this once more emphasizes his (male) ego. He is unwilling to let Adam, the product of the scientific experiment, be another man's child – ultimately, fatherhood is a matter of possession to him. Quite naively, Frankenthaler advocates for an archaic definition of paternity, attributing more meaning to the contribution of a single sperm than to the multifaceted contributions of a man who raises a child on a daily basis. Djerassi portrays Frankenthaler as a static character, a 'genius' in science but unable – and unwilling – to develop.

Challenging existing norms as a woman in science

While Laidlaw repeatedly emphasizes the personal dimension of her experiment – fulfilling her dream of motherhood – it is certainly not her sole motivation to perform the first ICSI experiment. In several exchanges between her and Frankenthaler, Laidlaw tirelessly advocates for a specific focus on the female side of reproductive technology and its possible effects on the empowerment of women:

> ICSI could become an answer to overcoming the biological clock. And if that works, it will affect many more women than there are infertile men. […] I'm not talking about ICSI and fame… I'm talking about ICSI and motherhood. […] Collective motherhood! Think of those women… right now, mostly professional ones… who postpone childbearing to their late thirties or even forties. By then, the quality of their eggs… their own eggs… is not what is was when they were ten years younger. […] So with ICSI, such women could draw on a bank account of their frozen young eggs and have a much better chance of having a normal pregnancy later on in life (AIM 1.2).

This passionate plea emphasizes the political dimension of Laidlaw's scientific work. With her experiment, she aims at improving the compatibility of motherhood and professional success – Laidlaw even goes so far as to propose the complete separation of sex and fertilization. Djerassi thereby smuggles his own futuristic vision of reproduction into the minds of his audience – as Eva-Sabine Zehelein highlights, Djerassi

> envisions a future where some men and women freeze their sperm and young eggs, then get sterilized and check out their gametes for wanted pregnancies […] by ICSI or some other artificial insemination, and no longer by sexual intercourse. (Zehelein 2008, 65).

Laidlaw is convinced that this (admittedly elitist and radical) vision of reproduction offers women the opportunity to achieve professional success without being constrained by the pressures of the 'biological clock'– an aspect which Frankenthaler,

from his androcentric perspective, fails to even consider. Laidlaw accuses Frankenthaler of viewing their experiment "through testosterone-tinted glasses" (AIM 1.2), whereas she claims that her glasses "aren't etched", as Frankenthaler suggests, "but polished" (ibid.), further emphasizing the specifically gendered dimensions of their experiment. Laidlaw's personal situation serves as fuel for the experiment – the fact that women like herself could benefit from the outcome of ICSI leads her to the conclusion that she should be the test subject on whom they perform the first ICSI fertilization. To Laidlaw, her personal involvement is not an ethical contradiction – on the contrary, she feels confirmed in her resolution to perform the experiment on herself.

In contrast to her male research partner Frankenthaler, Laidlaw challenges – and to some extent deconstructs – what I have previously referred to as the 'unworldliness of science'. To the female scientist Laidlaw, the culture of science remains a lonely space: "I'm surrounded by people… but they're scientists… and in this place, they're mostly men. […] We don't talk about ourselves." (AIM 2.7) Repeatedly, Djerassi portrays science as a culture that entirely consumes its members, leaving little room for personal life. In Laidlaw's case, her desire of becoming a mother – and the incompatibility of science and motherhood – is treated as a private matter, one that must remain separate from her professional life. As a scientist, she develops a scientific method to address her personal problem. Her success seems to prove her right: she publishes about her groundbreaking infertility treatment ICSI by herself, acknowledging Frankenthaler only for his "technical assistance" (AIM 2.11). Declaring Frankenthaler irrelevant to the success of the ICSI experiment is Laidlaw's ultimate revenge for his betrayal.

Since her scientific career has so far stood in the way of motherhood, she uses science to her advantage – she develops a scientific method to solve a problem which science, or, more precisely, (male) *scientists* have created. In other words, alluding to her last name, Laidlaw lays down the law – *her* law – for doing science. She writes her own rulebook for the world of science according to her own needs – successfully, as it appears. Her victory lies in finding alternative, radical ways of doing science while simultaneously leading a fulfilling private life. Yet, the question remains whether Djerassi's women in science have no other option but to resort to dubious, ethically questionable means in order to succeed in the scientific world.

With *An Immaculate Misconception*, Djerassi moves away from his previous, rather clear-cut division along the lines of the gender binary in his authorial choices of characters. Contrary to the female scientists in Djerassi's novels, who outplay their

male counterparts in virtually all aspects, the play presents a more nuanced and ambivalent example of a female scientist. Laidlaw is not portrayed as a morally superior counterexample to her male colleague – before becoming a mother, she is just as corrupt as her male antagonist. Djerassi presents her as a complex character who engages in highly problematic, unethical behaviors in her pursuit of both scientific and personal success. Yet, this does not mean that the play falls short of his novels in its gender-specific criticism of the culture of science. On the contrary, Djerassi's decision to blur gender-specific boundaries with regard to ethical issues makes the play even more compelling – both as a text and as a staged performance. The moral ambiguities and potential contradictions in *An Immaculate Misconception* carry the potential to motivate discussions by the reader and the audience, encouraging a vivid exchange about the norms of the culture of science – precisely the kind of dialog Djerassi sought to provoke through his literary works.

Exploring the Intersection of Gender and Race in the Sciences: *NO* (1998)

With the final novel of his Science-in-Fiction tetralogy, Djerassi explores the world of the high-stakes biotechnology industry and draws attention to ethical issues arising from newly developed drugs. The novel tells the story of Dr. Renu Krishnan, Indian-born biologist from Stanford University and Felix Frankenthaler's postdoc, whom we have first encountered in *Menachem's Seed*. In the late 1970s, Krishnan discovers how nitric oxide can be used to treat erectile dysfunction – a discovery which immediately sparks the interest of the biotech industry. In the process of commercializing the groundbreaking new drug "NO", Krishnan ultimately leaves the lab and becomes the president of the biotech company SURYA. Not only does she face the challenges of being a woman mostly surrounded by self-serving and profit-driven men, but she is also confronted with ethical dilemmas regarding the potential misuse of the new drug – dilemmas which could outweigh the benefits of the drug. Ultimately, it is her scientific integrity that leads Krishnan to the decision to halt the advancement of the commercialization of NO, not providing answers to the ethical questions raised in the process.

In *NO*, Djerassi brings back many of the characters from his previous novels, *inter alia* Isidore Cantor, Celestine Price, Max Weiss, Melanie Laidlaw, and Menachem Dvir, allowing for an intriguing conclusion of his tetralogy. More significantly, for the first time in his literary endeavor, Djerassi chooses a Person of Color (POC), Renu Krishnan, as his protagonist, enabling an intriguing portrayal of the intersection of gender and race in the culture of the natural sciences and technology. Moreover, Krishnan's personal life provides an insightful depiction of the potential challenges of a scientist couple – Krishnan falls in love with and marries her Israeli research partner Dr. Jephtah Cohn and ultimately, gives birth to their daughter Naomi. Paralleling her remarkable scientific success, Krishnan struggles with leading a non-traditional marriage in which the wife is more successful than the husband. Eventually, as my analysis will show, her most valued connection in the male-dominated field of the biotech industry is the bond with her fellow board member Celestine Price.

Krishnan's multiple cultures

With Dr. Renu Krishnan, Djerassi finally explores the fictional realities of a non-white character, adding more diversity to his oeuvre. Since she has relocated to the United

States for her university education, Krishnan regularly faces conflicts between her traditional Indian heritage and her American socialization. Her years of conducting research on nitric oxide in Jerusalem only amplify these issues. In multiple letters to her brother Ashouk, we observe the clash of her deep sense of responsibility for her family and her desire to lead a life diverging from their mother's values. In contrast to her mother – who goes so far as to take out an advert for her daughter in the *Indian Express* to find an eligible husband – Krishnan dares to break with Indian marriage tradition: "[…] I am not prepared to follow the (Indian) marital route. This does not mean that [I am] against marriage. Quite the opposite. But it will have to be on my terms." (NO 34). Eventually, she marries the Israeli Jew Jephtah Cohn, crossing not only cultural but also religious boundaries. As Cohn's wife, she deliberately chooses to keep her birthname – a decision which is not uncommon for female scientists who have published academic texts under their birth names prior to getting married. Yet for Krishnan, the decision is much more complex:

> It wasn't because she had started to publish as Renu Krishnan – a common enough reason for a modern professional woman not to change her name after marriage – but because she had a streak of nationalistic pride, coupled with a sense of personal autonomy that required the uncontaminated, unhyphenated retention of her birth name. (NO 90)

This example underlines how Krishnan's sense of self, particularly in relation to others, is shaped not only by her gender but also by her cultural heritage. Krishnan has to navigate in multiple cultures: as an Indian in the American culture, as an American in the Indian culture, as an Indian-American in the Israeli culture and even in the Jewish culture. As she constantly transforms and adjusts to foreign cultures, she is inevitably forced to give up fragments of her own cultural identity in the process. Still, Krishnan transforms her struggles into personal growth, as her undergraduate mentor Michael Marletta remarks approvingly: "You're another person. Self-assured, rising very fast in a totally different world from where you started: first India, now the States; first academia, now industry. Me … […] I started in academia and I'm still there." (NO 147)

Eventually, her ability to navigate in foreign cultures proves particularly valuable in mastering another unfamiliar territory: the male-dominated culture of science and technology. Interestingly, Krishnan attributes her intercultural expertise to her experience with the Indian caste system. In a meeting of the board of directors of SURYA, she reflects on her startled reaction to the tribal behavior of the male board members: "Was it a remainder of her Indian caste consciousness that had made her so

sensitive?" (NO 131) Krishnan transforms her cultural awareness into a specialized skill and uses it for her advantage. Willing to break new ground in research about erectile dysfunction, she is able to switch perspectives – an asset that ultimately makes her a better scientist than her male colleagues.

Choosing erectile dysfunction as object of research is, of course, inherently provocative. Given their phallic obsession, it is a highly sensitive issue for most men in the novel and the fact that Krishnan – a woman, no less – researches it, makes the endeavor even more fascinating to her. Eventually, Krishnan not only gets accustomed to her exceptional position as the only female on her research team – she begins to enjoy it. She particularly relishes her male colleagues' reactions to her presentations, which, unsurprisingly, are predominantly focused on the penis and its erectile function:

> Erectile function is excited territory. I would be lying if I didn't admit that I enjoy traversing it. As a professional participant – the only female in our research team – I can do so quite openly. I particularly enjoy it when Jephtah is present. Dissecting the responses of some of our male colleagues has become part of our pillow talk on the nights we share a bed. (NO 41 f.)

Krishnan intentionally uses her special role for her advantage. In front of an audience of eleven men, she opens her presentation about her research findings with a statement about the small size of penises of Gorillas – fully aware that "most women would be unlikely to raise [a piece of gorilla esoterica] in all-male company" (NO 52), yet hoping "to establish her credentials as a member of the club" (ibid.). Krishnan not only demonstrates a particular understanding of the male-dominated science tribe, she knows how she as a female has to navigate it in order to gain access to it. Consequently, as a female member of the tribe, she has no other choice but to condone rather unpleasant microaggressions by her male colleagues, such as "laughter [which] sounded like a locker room" and condescending, paternalistic comments about the name of the substance she has developed. Krishnan has chosen the name "NONOates" which prompts a diabetes specialist to remark without being asked: "Let's not broadcast this generic name too widely. […] Men may derive some subliminal message. And we all know how important psychogenic factors are in tumescence of the penis" (NO 53). Nonetheless, as Frankenthaler later proudly compliments her, Krishnan succeeds with her "impressive performance" (NO 56), further emphasizing the performative dimension of doing science.

Although she succeeds in becoming a member of the science tribe as a woman, Krishnan still strongly depends on the support of male mentors. One of her most influential supporter is her PhD advisor Dr. Felix Frankenthaler, an ambitious scientist virtually obsessed with research funding. Regarding gender in science, he is portrayed as an opportunist – fully aware of how to use the lack of representation of women in science in his favor to generate more funding. Repeatedly, he refers to his female postdoc specializing on nitric oxide and penile erections: "How could a female director turn down funding another woman, especially […] one as bright as [Renu Krishnan]?" (NO 8).

In doing so, Frankenthaler – likely without realizing it – promotes tokenism, defined as the "practice or policy of making merely a token effort or granting only minimal concessions, esp. to minority or marginalized groups" ("Tokenism", *Oxford English Dictionary*). As observed in *Menachem's Seed*, Frankenthaler wards off gender-specific criticism of his work by referring to his PhD student, Krishnan. When the woman seated next to him at the Brandeis fundraiser accuses him of gender inequality in his contraceptive research, he exclaims: "[…] for your information, the person in my lab doing the work is a woman!" (MS 13) In other words, he assumes that employing a female – an *Indian* female, no less – to research the inherently male issue of erectile dysfunction exempts him from ignorance of gender concerns. Frankenthaler fails to realize that one woman in a team of eleven men does not equate to gender equality.

Generally, the men in the novel remain oblivious to the women-specific struggles in the male science tribe. Martin Gestler, CEO of ZALA Corporation, prides himself on supporting female scientists, yet fails to realize the gender-specific pitfalls into which he repeatedly stumbles. When Krishnan points to Gestler's repetitive use of the phrase "the man with the idea" to refer to her, Gestler's response is humbling:

> "I know what you're going to say," he cut her off. "And you're right. Henceforth, I'll use a word without gender – a person's idea – but the fact is, until now it virtually always is a man's idea. As you will see in a moment, I'm interested in changing that. Now don't interrupt any more or we'll never get done." (NO 93)

Gestler's reaction is problematic on two levels. First, he perpetuates the widespread misconception that representation – or the lack of representation – mirrors realities. What Gestler, like many others, fails to acknowledge is that underrepresentation of women in science merely mirrors the male-dominated *culture* of the sciences, not the actual abilities women have – or allegedly do not have – to succeed in science. By doing

so, Gestler ignores the structural discrimination of women in science. Second, he remains oblivious to his very paternalistic mode of communication – he cuts Krishnan off, does not let her finish her sentence, and even demands her not to interrupt further. In a monological manner, he is convinced that he is sufficiently informed about gender-specific issues of women in science and does not require further consultation – not even by Krishnan, one of the few women in science could provide him with useful insights.

On multiple occasions, Krishnan finds herself alone, lacking vital support as a woman in science. When she informs Gestler of her pregnancy, he congratulates her, "though not with conviction" (NO 92). In the scientific world, pregnancy is an obstacle, clashing with fundamental cultural principles, such as the race to establish priority. Krishnan, therefore, expresses her uncertainty regarding the compatibility of motherhood and her career. Gestler, however, dismisses her concerns, outlines his plan for the commercialization of the drug NO and almost stoically includes Krishnan in it, as the success of the project depends on her. Krishnan, once more, expresses her doubts: "My role? […] But I'm pregnant. I haven't even figured out yet how to play the role of mother." (NO 96) Still ignorant of her concerns, Gestler begins to paternalistically explain – or "mansplain", as some might call it – his vision for her experience of motherhood (cf. ibid.). His monolog reveals how little he understands the pressure of balancing motherhood and a professional career:

> "Don't you believe in working mothers?" he asked, without giving me a chance to respond. "I do. And if you don't, then don't complain to me about glass ceilings. I'm not suggesting you sacrifice motherhood at the altar of personal ambition […]. [Y]ou'll have enough money for help, an au pair or whatever. […] And you have a husband. What about him? What about his role? (NO 100)

Gestler's remarks must be considered from different perspectives. While some of his statements are certainly problematic, he also raises relevant issues regarding gender-equal parenthood. However, his insensitive dismissal of Krishnan's – very valid – concerns about the compatibility of motherhood and professional success turns the struggles of professional mothers into an individual problem and negates, once more, its *structural* dimension. In other words, he claims that if a mother fails to succeed professionally, it is her individual failure – and not the system that fails her. At the same time, Gestler promotes gender-equality in parenthood, insisting that fathers should share caregiving responsibilities equally with mothers. Yet, it remains questionable whether this truly reflects his personal conviction or whether it is just

situational opportunism, since the success of developing the drug NO depends on Krishnan.

The marital issues of the scientist couple Krishnan and Cohn

Despite challenging circumstances, Krishnan manages to overcome several gender-specific obstacles in both the scientific and the corporate world. Yet, the issue that emerges as her personal glass ceiling is the compatibility of professional success and family life. In particular, her marriage appears strained by her achievements. Krishnan's husband, Jephtah Cohn, struggles with his role as husband of an exceptionally successful woman while he, as Gestler puts it, is relegated to 'manning' the domestic front (cf. NO 122).

The novel portrays Cohn as struggling with insecurities tied to his (concept of) masculinity, feeling overshadowed by his highly accomplished wife. As a scientist himself and thus, a representative of a group of (mostly) men with very specific notions of manhood, Cohn feels inadequate since his scientific achievements are less significant than those of his wife. His self-worth not only depends on his individual professional success but also on the concept of a gender-specific hierarchy between husband and wife, with the husband positioned at the top. Instead of seeking dialog with his wife about these insecurities, he chooses to sleep with Pandora, the caretaker of their daughter, instead – which Krishnan finds out not because her husband tells her but because she catches him red-handed as she returns early from a work trip (cf. NO 157). Ironically, her unexpectedly early return was caused by her feelings of guilt when Celestine Price, also a mother to a young child, remarks: "[…] I've got to catch a six o'clock flight to L.A. I promised Jerry that I'd be home in time to kiss my son goodnight. He's accustomed to seeing both his parents tuck him into bed." (NO 156)

In an overdue conversation, Cohn finally admits to his wife that he feels neglected by her: "You never ask these days what I'm doing." (NO 161) At a later point, he even demands of her to "listen to [her] husband for a change" (NO 162). Even though the division of labor in their marriage is not uncommon – many heterosexual couples have one professionally occupied partner while the other assumes more of the domestic duties – it is usually the female part of the couple who is in charge of the latter. In the case of Krishnan and Cohn, when traditional gender roles are reversed, it is especially Cohn – struggling with his concept of masculinity and manhood – who finds the arrangement difficult and turns to infidelity, notably with a subordinate,

further underscoring his desire to reclaim a sense of power. Notably, once his own scientific career takes off, the quality of their marriage significantly improves as well – yet, the underlying gender-specific issues remain unresolved.

Nonetheless, Krishnan also feels increasingly uncomfortable due to the gender-specific repercussions of her professional choices. In a letter to her brother, she points out: "Your sister has changed a lot. I'm getting tougher, in a very un-Indian way. It is probably the scar tissue one acquires while knocking around in a mostly male world, and I am not sure I like it." (NO 159) Once more, it becomes clear that Krishnan crosses boundaries in two territories: as a woman in science *and* as an Indian-raised in the USA. In both, she feels lonely and yearns for a sense of belonging.

Female bonds of solidarity in the male-dominated science tribe

The men in Krishnan's life, both in a professional and private context, are ignorant of her women-specific struggles – be it by either denying her support, masked as efforts for gender equality, like Gestler, or by demanding more attention for their own issues, like her husband. Krishnan thus lacks support in her significantly difficult situation as a woman in science. Ultimately, she realizes that she should turn to fellow female scientists like Celestine Price for advice:

> I wonder how Celly handles all this with her husband – the youngest American ever to have won a Nobel Prize in Medicine. My talks with Celly have started to cross over from shoptalk to woman-to-woman confessional. I hadn't realized how much I had missed that kind of contact with another woman. I'm sure Celly feels the same way. Otherwise, would she have agreed so readily to our semi-monthly meetings? Ostensibly, we're coming together so frequently because of the polyzenium project, but we're taking very long lunches and we don't talk much organic chemistry. Tomorrow I'm going to ask her about her husband. She hardly mentions him. (NO 165)

Krishnan desires interpersonal exchange about matters exceeding her scientific work, something that her monological male colleagues – and even her husband – apparently render irrelevant. In confiding with Price, Krishnan not only finds an outlet for her concerns and learns about Price's own struggles, but it is particularly the concept of *solidarity* that proves to be particularly worthwhile for both women. Their conversations span a range of both professional and personal topics, including competition, Nobel lust, and strategies of navigating the two-body problem in science and academia. Krishnan is particularly interested in the latter, especially regarding potential professional rivalry between Price and her husband Jerry Stafford.

Interestingly, Price attests the fact that Stafford has already won a Nobel Prize as the solution to the problem. She refers to Stafford's scandalous citing of T. S. Eliot during the Nobel Prize award ceremony: "The Nobel is a ticket to one's funeral. No one has ever done anything after he got it." (NO 169) Leaving the scientific sphere also resulted in the solution to the two-body problem in science for Price and Stafford. Stafford used the Nobel money to get into medicine and pursue an MD – this way, he could relocate anywhere his wife was offered an academic position (cf. ibid.), rendering the issue of intermarital competition in science irrelevant.

Beyond learning about alternative solutions to the two-body problem in science, the conversations with Price help her reflect upon her own marital struggles. Contrary to Price, she affirms the question whether she professionally competes with her scientist husband: "In Jephtah's eyes, probably yes." (ibid.) Krishnan seems insecure about the effects of her gender-nonconforming behavior as the professionally more successful wife: "I do enjoy exercising the authority that goes with my present job, but, until recently, I had not thought about how that looked through my husband's eyes." (ibid.) To highlight the weight of this statement, one has to imagine this was a conversation between two male scientists who are married to female scientists – it would be highly unusual for two men to express concern about how their professional success might affect their wives. Obviously, Krishnan's marital issues are not so much caused by her demanding career – they are caused by the very fact that she is the *wife* and not the husband, and that Cohn – unlike Stafford who has already won the scientific Olympics – struggles with his role in his marriage.

Compared to Krishnan, Price appears much more confident and less apologetic about behavior that defies traditional gender expectations. Her questions about Krishnan's decision to leave academia and instead pursue a career in the biotech industry urges Krishnan to reflect on her gender-specific struggles in her professional career. In addition to the absence of female role models, she views the overall circumstances in science as designed for men – and not for women: "They [her male mentors] were all very supportive and assumed all along that I'd stay in the academic pipeline, but […] no one talked about the extreme leakiness of that pipe, especially for women" (NO 170).

Krishnan admires Price for her remarkable achievement of securing a tenure-track position immediately after completing her PhD, yet she also believes that Price has gradually adapted the male-dominated code of conduct in order to persist in the relentless culture of the sciences: "[Y]ou seem to have accepted all of the male values." (ibid.) Price does not contradict Krishnan, yet replies: "And you're so different? […] In

your position as president of a high-tech company? In testosterone-soaked Silicon Valley?" (ibid.) This exchange highlights the quality of dialog between Price and Krishnan – their interaction is marked by genuine, productive engagement as they do not avoid potential conflict and ask each other straightforward questions. Unlike their male colleagues, Krishnan and Price do not struggle with ego-driven behaviors which often manifest in sensitivity to criticism, the inability to admit mistakes, rivalry, or self-centeredness – traits that frequently result in interpersonal conflicts. In response to Price's valid objection, Krishnan reflects on her own professional values rather than ending the conversation.

When dialog reaches its limits: Confronting the issue of race

However, the quality of dialog between Price and Krishnan does not preclude significant disagreements. Their conversation becomes less amicable when Krishnan introduces the issue of race in science – she remarks: "[T]here is one fundamental difference between the two of us. […] The color of our skin." (NO 180 f.) When Price protests, Krishnan's voice immediately "turns a scornful tone" (NO 171). She continues:

> You're like Prof. Frankenthaler. […] You're both unwilling to concede the existence of racial prejudice, because you two don't happen to be tainted by it. When I first raised the issue with the Prof – when he asked whether I was ready to look for an academic job – he pointed out that one-fourth of all members of the National Academy of Sciences are foreign born. I asked him how many of them were dark skinned and women. (ibid.)

Krishnan raises the issue of *intersectionality* in discrimination – both in science and beyond – referring to the "interconnected nature of social categorizations such as race, class, and gender, regarded as creating overlapping and interdependent systems of discrimination or disadvantage" ("Intersectionality", *Oxford English Dictionary*). Krishnan's reality as a female POC in science differs significantly from Price's reality as a white woman. As an individual in a position of privilege – Price's reaction to Krishnan's remark mirrors that of their male colleagues when asked to acknowledge the struggles of women in science: she dismisses them. From her limited perspective, Krishnan's reality does not seem plausible to her. Thus, when the issue of race is introduced, Price's capacity for open dialog reaches its limits.

By (finally) exploring the issue of race, Djerassi adds a new dimension to his examination of the culture of the natural sciences. With Krishnan, Djerassi has

deliberately chosen the (fictional) example of an Indian female, seeing parallels to his own biography. He explains in his foreword to the novel:

> [Indian women] remain triply marginalized: as women in a historically male-dominated field, as foreigners of color (even should they become naturalized citizens) and, finally, coming as they do from a culture in which a woman's role is clearly defined, by the process of eventually losing part of their native culture without gaining an acceptable new one. Renu Krishnan represents a distillation of the complicated conflicts faced by such women. […] Renu confronts in a pressing personal form the problem of bridging gaps between widely divergent subcultures that has been the challenge facing all my characters – and especially me, the immigrant scientist turned fiction writer in his adopted language. (NO x)

Djerassi provides a critical reflection of alternative scenarios for successful women in science – and with Krishnan, he has definitely created the most complex and interesting female character of his Science-in-Fiction tetralogy. Although Djerassi draws attention to the *structural* discrimination of women in the sciences, the novel's weakness lies in the implicit assumption of the individual's responsibility to overcome structural discrimination. As Ingrid Gehrke remarks, Krishnan's balancing act of motherhood and her highly demanding career appears a little too easy to be plausible (cf. Gehrke 2008, 97). With a newborn of not even two weeks, Krishnan already returns to the workforce and has hired a 22-year-old English au pair to care for her baby (cf. NO 138). Given the fact that paid maternity leave in the US is not legally guaranteed, the novel certainly represents the realities of many mothers. Yet, due to the portrayal of Krishnan as a *role model* for professional mothers, the novel promotes a capitalist and highly privileged depiction of motherhood, in which gender-specific challenges such as caregiving are solved by delegating it to employees. A more inclusive depiction of successfully balancing motherhood – or, more accurately, *parenthood* – could involve alternative models of heterosexual parenting, including a focus on the representations of gender-nonconforming husbands and fathers.

Phallacy (2005): Masked Misogyny in the Debate of Science versus Art

In his play *Phallacy*, first published in 2005 and re-published in an edition with his play *Insufficiency* under the title *Chemistry in Theatre:* Insufficiency, Phallacy, *or Both* (2012), Carl Djerassi culminates in his endeavor as a writer. In this work, he connects the most prominent issues and themes of his literary works: the relationship of science to art and *vice versa*, the notion of scientific 'truth', and the code of conduct in the sciences. Central to this play is the question of authenticity of art works and the supposed opposition of truth versus beauty. If a piece of art that has been appreciated for its beauty turns out to be a replica, does it lose its value even though it is just as beautiful as the original? *Phallacy* investigates the possible outcome of a very real dispute between natural science and art history. Modern chemical analysis has shown that the bronze *Jüngling vom Magdalensberg*, for over 400 years believed to be a Roman original, is in fact a Renaissance cast. In a rather elaborative preface, Djerassi explains the theme of his final Science-in-Theater work. Apart from exploring the values of beauty and aesthetics via-à-vis financial values in art, he delineates "the quirks and idiosyncrasies of art historian and scientist when they examine the age of an art object from their grossly different perspectives" (PH xx). Djerassi's representation of the battle of science versus art and art history once more alludes to the Two Cultures dichotomy by allowing two counterparts deal with the same object, "namely aesthetic and art historical connoisseurship versus cold, chemical material analysis" (ibid.). Yet, this time, as I will show in the following section, this conflict is used as a smoke screen to mask misogynist attitudes by the male scientist towards the female art historian in the play.

The Two Cultures in Phallacy

By order of the director of an Austrian museum, chemist Dr. Rex Stolzfuss examines the chemical composition of the bronze statue *Jüngling vom Magdalensberg*, a statue that, up to that point in time, was believed to be a Roman original. Stolzfuss' recent analysis proves that the statue is in fact a copy from the Renaissance period. His antagonist is Dr. Regina Leitner-Opfermann, an art historian and the director of the department of antiquities in an important Austrian museum – it can be assumed that this is in fact the *Kunsthistorisches Museum* in Vienna, the Austrian capital's Museum of Art History (cf. Gehrke 2008, 190). Leitner-Opfermann's career is based on her

academic research on that very statue. Stolzfuss' latest findings threaten her academic and professional reputation and she thus refuses to accept the results of Stolzfuss' recent chemical analysis. The art historian becomes Stolzfuss' nemesis – the relationship between them mirrors the clash of the so-called 'Two Cultures'. Both view their own discipline superior to the respective other and the communication between the two is not only flawed but appears to be entirely impossible.

As it is often the case in Djerassi's literary works, the choice of names for his characters are aptronyms: Rex and Regina are two first names with very similar meanings – 'king' and 'queen' in Latin – and allude to their pride, haughtiness, and hubris regarding the allegedly unparalleled significance of their disciplines. At the same time, it emphasizes the relationship of the two as counterparts – male and female. The choice of names for the other characters is quite telling as well: The last name of Stolzfuss' research assistant Dr. Otto Ellenbogen mirrors the level of competitiveness and ruthlessness which he is willing to use in order to succeed in his discipline – he 'elbows his way' through science to become a successful scientist. The last name of the assistant curator of the Renaissance art department at the museum, Emma Finger, who researches the true origin of the statue together with Leitner-Opfermann carries a different meaning: A finger is a body part which bears less of a physical threat, yet is crucial for the purpose of performing intricate tasks. At the same time, 'Finger' can be understood as an allusion to Emma Finger's role as pointer towards problematic issues in the culture of science.

While Djerassi has frequently touched upon the dichotomy of science versus art in his preceding literary works, it is most prominent in his play *Phallacy*. The ever-deepening disputes between Leitner-Opfermann and Stolzfuss dominate the entire plot of the play. Despite their different professional backgrounds, the two share intense hubris and professional narcissism. In his review of the play for *Chemical & Engineering News*, Rick Mullin accurately points out:

> The main characters, Regina Leitner-Opfermann, director of the department of antiquities at the museum, and Rex Stolzfuss, a chemist in charge of art conservation at an unnamed technical institution in Austria, are enantiomeric in their arrogance, deception of self and others, and fatal flaw of falling in love with theories and ideas. (Mullin 2007)

Phallacy impressively depicts two successful but obsessively driven individuals who lose themselves entirely in their respective fields. Regina Leitner-Opfermann, for instance, develops a full-blown obsession with the *Jüngling vom Magdalensberg*. The boundaries between the professional and personal are blurred as it becomes clear

when Leitner-Opfermann, in a conversation with assistant curator Emma Finger, refers to the statue like to a lover:

> I've lived with that young man for years. But instead of taking him for granted – or even worse, getting bored with him – he's turned into an ever-increasing passion. When I thought that there wasn't a millimeter of his body I had not explored, suddenly – sometimes in the middle of the night – a missing detail would hit me. (PH 66)

The reaction of Finger reveals that Leitner-Opfermann's level of obsession with her research object is in fact uncommon even in the culture of art history. In the course of the exchange, Finger's utterances become shorter and shorter while Leitner-Opfermann increasingly loses herself in listing the measurements of the different body parts of the statue (cf. PH 66 f.). Finger, who obviously feels more and more uncomfortable by the testimony of Leitner-Opfermann's obsession, ultimately asks her to stop and tries to leave the situation. Interestingly, the numbers of the measurements of the statue appear to serve a specific purpose in this context. While to Leitner-Opfermann they seem to represent reality, rationality, and the factual existence of the statue and of the research revolving around the statue, they also emphasize the mad obsession of the researcher with her research object. In other words, when reason – in this case in the form of numbers – enters, the dimension of irrationality of Leitner-Opfermann's research can no longer be concealed or ignored. Ironically, her obsession with the statue has led her to make unreasonable decisions in her research. Her past ignorance of the state of the untarnished patina, caused by her "feeling he [the statue] was authentic" has endangered the outcome of her entire research and professional reputation (cf. ibid.).

Rex Stolzfuss displays a similar obsession with his research and with receiving recognition for his research – without being aware of it. Stolzfuss repeatedly advocates rationality and irrefutable factuality in science. His rejection of Leitner-Opfermann's art historical analysis of the statue "is not meant personally" but simply scientific: "The business of a scientist is to question all evidence and then to confirm or refute it through independent means." (PH 59) Yet, his obsession with his own research – and, more importantly, with proving Leitner-Opfermann wrong – falsifies his own claim. In both cases, the scientists' extreme obsession with their research leads to irrational actions and the clouding of their professional judgment. The play impressively displays what happens when scientists – regardless of their field and academic background – turn to mad-scientist-behavior. Ultimately, their obsession leads to failure in their respective fields.

In their discussions about the authenticity of the bronze statue, Leitner-Opfermann and Stolzfuss reveal their egocentric, one-dimensional understanding of truth with regard to the respective other academic discipline. To Leitner-Opfermann, chemistry is "sterile crap […] consisting of rules promoted by art-hating boors, shielded from any sense of beauty by a dense fog spread from ear to ear" (PH 60). Despite her plea for the many facets and the dazzling diversity of art – she calls art no less than "[a]n image from the mirror of life" (PH 61) – her rejection of the sciences, especially chemistry, appears surprisingly ignorant and shallow. Leitner-Opfermann's antiscientific views mirror none of the multifaceted characteristics of her own academic discipline: In her disputes with Stolzfuss, she reveals an undifferentiated image of chemistry as a scientific discipline and makes extensive use of generalizations and hateful stereotypes:

> Someone really ought to prick that balloon of self-righteous … pompous … simplistic arrogance of yours. No, not simplistic – *cocksure*. Transforming the wine of aesthetics into vinegar! How typical of you chemists. When chemists dabble with art, the best that can be said is the results are unpredictable. (PH 61).

In his role as her antagonist, Stolzfuss refutes the significance of aesthetics in art at large. When discussing the value of the bronze statue at question, he claims to be exclusively interested in scientific evidence. His sole aim is to prove that the statue is a replica – he deems all other art historian elements in this context insignificant: "For this discussion, the beauty of the sculpture is not important. Even the sculpture is not important" (ibid.). As he points out, he is only looking for "truth" (ibid.) – without specifying his definition of 'truth'. Once again, Djerassi depicts his male scientist as ignorant – even naïve – due to his inability to reflect upon his own values and beliefs with regard to the scientific endeavor.

In this context, it is worthwhile to examine the quality of the communication between the characters. The communication between Leitner-Opfermann and Stolzfuss appears to be particularly dysfunctional as they display an inability to productively discuss with the respective other. They do not respond to the other's utterances, even to the point of talking at cross purposes. When Leitner-Opfermann asks Stolzfuss about his opinion on the artist Paul Klee, Stolzfuss quite tellingly replies: "We're talking about bronze … not clay" (PH 64). Leitner-Opfermann and Stolzfuss are not interested in productive discourse – each entirely rejects the views of her/his counterpart. By further quoting Paul Klee, Leitner-Opfermann makes her aversion of science – and her lack of interest in real exchange – abundantly clear: "Your scientific

ideas just fetter us artists. They renounce the wealth of the soul. Thanks, but no thanks!" (PH 64)

With his emphasis on the two scientists' inability of communicate productively, Djerassi once more alludes to Snow's Two Cultures dichotomy: As mentioned before, Snow attests the "two poles" a division by "a gulf of mutual incomprehension – sometimes […] hostility and dislike, but most of all lack of understanding" and attributes this situation to entirely different attitudes, "even on the level of emotion" (Snow 2013, 4). These aspects can be clearly observed in the disputes between Leitner-Opfermann and Stolzfuss. Yet, the critical potential of the play does not end here. The female characters in the play bridge the gulf between the opposing parties – in this case, between science and the art – and through this enable a compromise.

Gender in Phallacy*: Misogyny masked as scientific concerns*

Quite obviously, the issue of gender lies at the core of the play *Phallacy* – the title itself refers to gender. With his play on the words "phallus" and "fallacy", Djerassi points towards the utter lack of understanding by his male scientists of Leitner-Opfermann's disregard of the statue's penis in her extensive study. It can also be understood as criticism of the faulty reasoning on the side of Stolzfuss concerning his one-dimensional concepts of art, science, and truth. Yet, the gendered quality of the play becomes especially clear when examining the character development – or lack thereof – of Rex Stolzfuss.

As shown above, both Leitner-Opfermann and Stolzfuss display mad-scientist behavior due to their obsession with their own academic fields. Yet, there is a difference in the quality of their obsessions. Leitner-Opfermann's obsession is solely directed towards the statue itself while Stolzfuss obsesses over humiliating Leitner-Opfermann and devaluing her academic legacy. He condescendingly refers to Leitner-Opfermann as "that woman" and complains to his assistant Otto Ellenbogen about "what she *dared* say to [him]" (PH 68). Stolzfuss' true motivation to denounce Leitner-Opfermann publicly becomes clear when he tells his assistant: "I want every reader of that paper to realize that sophisticated science wasn't needed to demonstrate how wrong she was. Simple horse sense … uncontaminated by all that art historian crap." (ibid.) The issue here is not only his ego as a scientist but his ego as a *male* scientist who is unable to accept criticism by a female – irrespective of her profession. Stolzfuss is so offended by Leitner-Opfermann's quote of Paul Klee that he declares "This is war!"

(ibid.) and begins to scheme an elaborate, very complicated, and probably rather costly prank. He urges his assistant Otto Ellenbogen to fabricate bronze casts of three sections of the statue at question in order to offer them, disguised as a Spanish dinosaurologist who claims to have found these items during a dig in Spain, to Leitner-Opfermann. Stolzfuss thereby aims at humiliating Leitner-Opfermann and at proving the alleged illegitimacy of art history as a whole. The execution of the prank is so absurd that it includes a fake moustache as well as a fake Spanish accent by Ellenbogen which probably results in a humorous moment on stage, further emphasizing the ridiculousness of Stolzfuss' scheme.

Nonetheless, Stolzfuss never reaches the point of self-reflection or questions his behavior. In a conversation with Emma Finger, he even goes so far as to claim: "I did her a favor. […] So she wouldn't make a fool of herself with the museum director or potential donors. […] I also wanted to teach her a lesson … that she can't refuse to listen to scientific facts because of some art historical obsession." (PH 105) On multiple levels, Stolzfuss reveals his misogynist mindset. Not only does he patronize Leitner-Opfermann by allegedly saving her from embarrassment, he considers himself eligible to teach her on scientific facts, question the entire methodology of art history, and meddle with her academic legacy – taking the concept of 'mansplaining' to a whole new level. Similarly, Stolzfuss encounters Emma Finger in a way which mirrors both his hierarchical thinking as well as his sexist attitude towards women – he calls her Leitner-Opfermann's "underling" (PH 107), "surrogate" (PH 104), and "stooge" (ibid.) and thereby demonstrates his dominance over the younger woman. It appears that the 'war' which Stolzfuss has declared is truly a gendered war – and a quite unilateral one. While Leitner-Opfermann certainly does not shy away from confrontation, it is her opponent Stolzfuss who aggressively takes their conflict to a new level, highly influenced by his archetypically masculine competitiveness and dominance behavior as a scientist.

Unsurprisingly, Stolzfuss' manifestations of his misogynist attitude do not only concern his treatment of females – his urge to dominate others also affects his male assistant Otto Ellenbogen. Without exception, Stolzfuss treats his assistant as subordinate, revealing his particular understanding of science as a hierarchical system. Like in *Cantor's Dilemma*, the nature of the mentor-mentee-relationships in *Phallacy* is an indicator of gendered patterns of behavior in science and, in this case, in art history. Stolzfuss acts as the typical 'alpha male' in science – despite demanding of Ellenbogen to mold the fake bronze casts, he insists on adding what he calls "the master's touches" himself (PH 90). Not only does this mirror Stolzfuss' self-perception of professional

superiority, it also shows how Stolzfuss establishes co-authorship by investing minimal effort. When Ellenbogen points out the latter, Stolzfuss dismisses his criticism by humiliating his assistant: "You're a bit of a smarty-pants, aren't you, Otto?" (ibid.)

Similar to the issue of co-authorship in mentor-mentee-relationships in *Cantor's Dilemma* – and its criticism by humanities PhD student Leah Woodeson – *Phallacy* presents this practice once again as a common manifestation of hegemonic masculinity, masked as the 'typical' behavior of a scientist. Contrary to Stolzfuss' attitude, Leitner-Opfermann values Finger's work and does not consider her a subordinate: "Emma is not my underling" (PH 107). Despite the fact that Leitner-Opfermann displays a similarly inflated ego – after all, she corrects Geraldo Lopez, Ellenbogen in disguise, to call her "Doctor Leitner-Opfermann" (PH 99) – her striving for success and recognition does not result in the humiliation of others.

Ultimately, the male scientists Stolzfuss and Ellenbogen are not successful with their questionable actions. Stolzfuss' article on the results of the new chemical analysis of the statue will very likely lose momentum because Leitner-Opfermann has discovered the real origin of the statue which she intends to publish in a paper; Otto Ellenbogen loses his girlfriend Emma Finger who cuts ties with him because she disapproves of his "juvenile prank" (PH 104) and consequently has lost trust in him (cf. PH 107). Surprisingly, a couple of weeks later, Leitner-Opfermann makes a "peace treaty" (ibid.) and offers Stolzfuss to publish a joint paper on the authenticity of the statue, including the latest results of its chemical analysis. The play closes with Leitner-Opfermann accepting Stolzfuss' invitation to have lunch (cf. PH 112).

This conclusion of peace can be considered an example of beneficial collaboration, maybe even interdependence of science and art – *Phallacy* shows that the alleged Two Cultures indeed have the potential to produce fruitful discourse. Yet, once again, it is the female in Djerassi's literature who casts her ego aside. Contrary to her opponent Stolzfuss, Leitner-Opfermann displays the ability of self-reflection and collaboration, paving the way to a resolution to their dispute, both on a scientific and a personal level. Unlike her male competitor, she shows a stereotypical feminine willingness to compromise and reflect. It is Leitner-Opfermann – not Stolzfuss – who utilizes her failure to reflect upon her own shortcomings and furthers her personal and professional behavior (cf. Gehrke 2008, 191), for instance, as she offers Emma Finger to call her by her first name. Leitner-Opfermann, otherwise rather distanced and bound to hierarchies, begins to break down the hierarchical structure of the mentor-mentee-relationship.

Yet, the ending is not to be understood as a romanticized solution to the science versus art debate. Following the agreement of Leitner-Opfermann and Stolzfuss to publish a joint paper, the dispute over the order of names in their academic publication appears to immediately thwart all peace offers. Leitner-Opfermann suggests the common practice of alphabetical order of names – knowing that this would make her first – which Stolzfuss promptly refuses: "My name has always come first in every paper I ever published" (PH 110). As Leitner-Opfermann humorously remarks, "[their] rapprochement seemed promising while it lasted. All of four minutes … going on five" (ibid.), underscoring the absurdity of their behavior. While neither of them caves in, Leitner-Opfermann at least displays a certain level of self-reflexivity which her male counterpart lacks entirely. The scene highlights how seemingly arbitrary factors, like the order of names in publications can determine scientific success – or failure. As the dispute between Stolzfuss and Leitner-Opfermann demonstrates, this is rooted in the gendered quality of the dominance behavior of scientists, deeply embedded in the culture of the sciences.

From Prose to Drama: Djerassi's Shift from Science-in-Fiction to Science-in-Theater

Following his Science-in-Fiction tetralogy, Djerassi decided to turn to the genre of drama in the mid-1990s. To him, the process of writing a dramatic play mirrors the scientific method – even more so than writing fiction: "To some extent, the give and take of playwriting and play development resembles scientific research and publication, so different from the solitary focus of the fiction writer" (TMP 267). In turning to playwriting, Djerassi comes full circle as the genre allows him to draw on specific skills acquired as scientist while deliberately omitting cultural aspects of science which he deems problematic. As a playwright, Djerassi published many more plays than prose works – his venture from prose to drama thus impacted his literary career significantly.

My thesis has so far shown that gender-specific constructs are foundational in Djerassi's portrayal of the (tribal) culture of the sciences in his novels and plays. Djerassi's scientists are a *gendered* tribe, constituted by repeated acts of manhood, both in his novels and his plays. Yet, what is the effect of his shift from prose to drama? Are there genre-specific elements in drama which impact the portrayal of gender-specific issues in science?

The significance of dialog in drama – letting women speak

As I have pointed out before, the monological nature of the sciences was a major motivation for Djerassi's turn to fiction – first as novelist, then as playwright. In his non-fictional works, Djerassi frequently emphasizes his deep fascination with the dialogical nature of drama, both as a frequent theatergoer and as an author of dramatic plays. With his background in the sciences and "four decades of […] scientific writing, with its monological and impersonal monotony" (TMP 147), Djerassi was particularly intrigued by the multiperspectivity of drama which ultimately compelled him to become a playwright. Particularly with his dramatic works – given their dialogical structure – he aims at overcoming his "monologist training" as a chemist (TMP 278 f.).

In general, a dramatic text creates a heightened sense of immediacy between the text and the recipient of the dramatic text – the recipient "feels directly confronted with the characters presented" (Pfister 1988, 3). Unlike prose, drama lacks a single narrative voice, which is compensated for through theatrical, structural, or performative

elements. Ultimately, the characters' utterances serve as the primary narrative tool and constitute the central mode of discourse in drama.

Most importantly, according to Manfred Pfister, "the characters are allowed to present themselves directly in their role as speakers" (Pfister 1988, 6). Thus, contrary to his prose works, Djerassi relies more heavily on the individual viewpoints of the characters in his plays. In the preface to his two science-in-theatre plays *ICSI* and *Taboos*, Djerassi states:

> Presenting information in the form of dialogue produces an effect of vivacity and immediacy and permits complex arguments to remain unresolved – as they are in real life. Yet since the beginning of the Age of Enlightenment, dialogue has essentially disappeared from the written discourse of scientists. (Djerassi 2008, vii)

By using the form of dialog, Djerassi draws the readers' attention to the lack of objectivity of science and offers a multi-perspective exploration of scientific issues, such as, for instance, the question of who discovered oxygen. Not only do the scientific issues in his plays necessitate contextualization and discourse – particularly the cultural issues in his plays require multiple perspectives. Djerassi views dialogue as a representation of "real life" (ibid.) and criticizes the discourse in the culture of science as 'unworldly', in the sense that it is detached from reality, an aspect I have previously explored in my literary analysis.

By turning to the genre of drama, Djerassi shifts the focus of the audience on the characters' voices and through this, tells "tales of science and scientists, in a format that reproduces direct interaction among human beings rather than in the voice of a third person, 'omniscient' narrator'" (Djerassi 2008, vii), further stressing the immediacy of dialog. In *An Immaculate Misconception*, for instance, the audience observes the scientists Laidlaw and Frankenthaler in their natural habitat and listen to their exchanges, emphasizing the anthropological quality of Djerassi's plays. In the play – as opposed to the novel *Menachem's Seed* – Djerassi lets Laidlaw speak and advocate for herself. Her reasoning is not contextualized by the voice of a narrator, the audience (or the readers, respectively) is directly exposed to *her words*. In this way, Laidlaw becomes an active, empowered advocate for her own agenda as a female scientist.

Djerassi gives women in science a voice – not only in his dramatic texts but, quite literally by placing them on the theater stage. In doing so, he not only brings visibility to women in science but provides them space to express women-specific perspectives on issues in science. In contrast to this, Djerassi's novels reveal the potential impact of a (male) narrative voice on the portrayal of female characters.

Especially *The Bourbaki Gambit* with its first-person narrator Max impressively points out what happens when the female characters in the novel are contextualized from a male perspective. For instance, Max refers to Diana with the following words: "If an elderly woman can look kittenish, [Diana] did" (TBG 7). Not only does Max use a term used to ascribe an allegedly 'flirtatious' quality to the outward appearance of a woman – defined in relation to a male counterpart – but also assumes that a woman of an advanced age is naturally excluded from this. Another significant example is Max' description of Charlea's looks when he first encounters her:

> That's when I noticed that her slip was showing. The stretch of white slip shone brightly in the sunshine, so brightly it seemed she'd pulled it down below the hem of her dark green skirt as a deliberate challenge: to show that dress or appearance simply didn't matter. She wore absolutely no makeup; her hair seemed to have been cut by a man's barber. What a contrast to [Diana]! (TBG 56)

Max categorizes women into attractive and unattractive women and judges them according to how much they tend to their outward appearance – an aspect entirely irrelevant to his scientific project. Remarkably, the looks of his male colleagues are negligible to him, as he does not even mention them. These examples demonstrate the significant effect of a male narrative voice when it reproduces the male gaze, a concept from feminist film theory and art history which refers to "the frequent framing of objects of visual art so that the viewer is situated in a 'masculine' position of appreciation" (Korsmeyer and Brand Weiser 2021). The fact that Max, as the narrative voice, reveals his own sexist attitude towards women encourages the reader to critically examine this problematic perspective. Yet, forgoing a male narrative voice and letting women speak for themselves in the genre of drama allows them to directly challenge sexist stereotypes. This shift draws greater attention on their own perspectives – and less on the male perception of their looks.

Moreover, as Ingrid Gehrke highlights, the dialogs between Laidlaw and Frankenthaler emphasize the problematic relationship of the two scientists. Drama, with its more or less exclusive focus on dialog, stresses this aspect even more. In spite of their lengthy exchanges about their research, they mostly talk at cross purposes and do not respond to one another's utterances (cf. Gehrke 2008, 179). Pfister refers to this type of flawed communication as "monological tendencies in dialog" which can be

> the result of disrupted communication which, in turn, may be either because the channel between the dialogue partners is severely disrupted or even non-existent […], because they employ strongly diverging codes, thus causing incomprehension or grave misunderstandings, or, finally, because their referential contexts are so different that the minimum consensus required for communication to take place is missing (Pfister 1998, 129).

An example for the dysfunctional communication between Laidlaw and Frankenthaler in *An Immaculate Misconception* can be found at the beginning of the play when the two reflect on the possible groundbreaking effects of their newly developed fertilization method ICSI:

> FRANKENTHALER: My patients just want to fertilize an egg. They won't care if it's under a microscope or in bed… as long as it's their own sperm.
>
> MELANIE: You're focusing on male infertility… that's your business. But do you realize what this will mean for women?
>
> FRANKENTHALER: Of course! I treat male infertility to get women pregnant.
>
> MELANIE: (Amused) Felix, you haven't changed. You're a first-class doctor… (Pause)
>
> FRANKENTHALER (Bantering) But, but, but … Let's hear the but.
>
> MELANIE: But… you look at everything through testosterone-tinted glasses.
>
> FRANKENTHALER: (Still affectionate banter) And what's my colleague's estrogen-etched view?
>
> MELANIE: In the case of ICSI, that's easy – especially since my glasses aren't etched, but polished.
>
> FRANKENTHALER: Aha!
>
> MELANIE: Maybe that's why I see further than you. (Beat) ICSI could become an answer to overcoming the biological clock. And if that works, it will affect many more women than there are infertile men. (AIM 1.2)

Frankenthaler exclusively considers the male perspective of their research – and is blatantly ignorant of the female side of reproductive technology. Unsuccessfully, Laidlaw tries to broaden his horizon with her female perspective on the possible implications of the ICSI experiment for women. As Gehrke points out, through these monological tendencies in dialog, Djerassi breaks with the traditional dialogical form of the classical drama in order to draw attention to the monological nature of scientists – and, as becomes evident towards the end of the play, its destructive effect on the communication between scientists (cf. Gehrke 2008, 179). Due to the cultural quality of the sciences, new perspectives – for instance, gender-specific angles on reproductive technologies – tend to be ignored. The monological tendencies in the communication between Frankenthaler and Laidlaw are caused by a lack of referential context, as each

exclusively focuses on their own positive outcome of ICSI, ultimately resulting in a lack of minimal consensus.

In *Oxygen*, Djerassi presents a counterexample of dialog between Astrid Rosenqvist and Ulla Zorn which shows how communication, even between members of different academic fields, can function productively:

> ULLA ZORN
> I hope you don't mind my asking: what about you and the Nobel Prize?
> ASTRID ROSENQVIST
> No Swedish woman has ever gotten it in any science. One will eventually.
> ULLA ZORN
> Aren't you the first woman who has ever chaired a Nobel Committee?
> ASTRID ROSENQVIST
> Yes.
> ULLA ZORN
> How important is that to you … being first?
> ASTRID ROSENQVIST
> You are beginning to sounds like a district attorney … or a shrink.
> ULLA ZORN
> Sorry about that. I just wanted to know what price you're willing to pay to be successful as a scientist … and as a woman.
> ASTRID ROSENQVIST
> I have no children. Many would consider that a heavy price.
> ULLA ZORN
> Like Madame Lavoisier? *(Pause)* Is the committee your child? […]
> (OXY 35)

In spite of the hierarchical nature of the relationship between Rosenqvist and Zorn – after all, Zorn is officially Rosenqvist's secretary on the committee – the two manage to maintain open and productive communication. Even the fact that the two represent the (allegedly) opposed Two Cultures does not hinder functional exchange between them. The exemplary dialog above, as opposed to the previously quoted dialog between Laidlaw and Frankenthaler, conforms much more to Pfister's understanding of an "ideal form of 'dialogical dialogue'", as it is "an undisrupted form of two-way communication of two or more figures who represent polar opposites and whose interrelations are marked by a high level of tension" (Pfister 1988, 129). Tension, in this context, does not mean conflict – the purpose of this 'ideal' form of dialog is the exchange of information – an exchange that can only occur if two (or more) characters have information which the respective other does not possess yet. Furthermore, Zorn and Rosenqvist "constantly refer to one another in their speeches" and have roughly the same amount of utterances (ibid.). As I have already explored in my analysis of *Oxygen*, chemist and committee member Hjalmarsson serves as a counterexample – in

the typical manner of Djerassi's monological (male) scientist, he makes far more utterances than anyone else in his conversations.

Clearly, the genre of drama emphasizes the monological tendencies of Djerassi's male scientists. Not only do Djerassi's literary works hereby highlight the male scientists' inability to maintain functional communication caused by their gender-specific dominance behavior, they also propose an alternative model of functional communication by Djerassi's female scientists.

Drama, performativity, and gender

A discussion of the dialogical structure of Djerassi's plays – and their effects – also needs to include the aspect of performativity. In general, performativity can be understood as "the power of language to effect change in the world" (Cavanaugh 2015), based on philosopher John L. Austin's groundbreaking speech act theory. This theory states that individuals not only present information through performative language but in fact perform an action as well (cf. Austin 1962, 6). In a theater performance, speech act theory is of course particularly relevant due to its focus on speech *and* performance on stage. As the fundamental form of presentation in drama, dialog becomes spoken action:

> […] each individual dramatic utterance does not just consist in its propositional expressive content alone, but also in the way it is itself the execution of an act – whether in the form of a promise, a threat, or an act of persuasion, etc. Therefore, the performative aspect described by speech-act theory is always present in dramatic dialogue. […] As a speech act, the dramatic speech constitutes its own particular speech situation. (Pfister 1988, 6)

Even more, as W. B. Worthen, professor of theater and performance studies, points out, "utterances perform actions […] when they iterate familiar verbal and behavioral regimes" (Worthen 1998, 1096). English professors Andrew Parker and Eve Kosofsky Sedgwick use the example of marriage in this context: "[T]he performative force of marriage is enacted not by the Austinian utterance, the text 'I do', but by the ways this utterance text performed within the ceremony, cites and so reenacts the institutions of compulsory heterosexuality; […] the 'I do' cites and so reproduces an entire genre of performance" (Worthen 1998, 1097). Thereby, marriage itself becomes "like a play" (ibid.). In other words, the *reiteration* of a text performs a function and creates realities.

In this context, rituals and ritualized actions offer a way of understanding performance also in "explicitly nontheatrical terms" (Worthen 1998, 1098). In the

world of science, as depicted in Djerassi's literary works, ritualization is central – Djerassi portrays science as a culture highly dependent on its rituals. These include, *inter alia*, the process and practice of scientific publication, the ways of giving academic presentations, the order of names in scientific publications, the keeping of lab journals, and the ritualized manner of rewarding prizes for scientific breakthroughs. In this context, drawing on Parker and Sedgwick, one could argue that the culture of science itself resembles a play, characterized by the reiteration of utterances with a performative function.

Interestingly, Djerassi himself attests science a fundamentally dramatic character: "Science is inherently dramatic – at least in the opinion of scientists – because it deals with the new and unexpected" (TMP 245). Matthias Kleiner similarly views the sciences as dramatic in nature, noting that: "It often defines a problem, develops it, moves towards a crisis, and finally, with some delaying moments, works its way towards a solution." (Kleiner 2012, 4, translation DSS). Accordingly, Gehrke views parallels between drama and the culture of science portrayed in Djerassi's literary works. The complex relationships among scientists, shaped by competition and striving for priority, for example, frequently resemble a rather dramatic power play (cf. Gehrke 2008, 173).

Science, drama, and the Two Cultures

Naturally, connecting science and drama requires a discussion of the Two Cultures dichotomy. Kirsten Shepherd-Barr, Oxford university professor of English and Theatre studies, views the theater as the central space to explore the interaction between science and the humanities. In her monograph *Science on Stage. From Doctor Faustus to Copenhagen* (2006), she presents a comprehensive analysis of science plays and their potential for the Two Cultures debate. In her thorough study, Shepherd-Barr examines several science plays, including some of Djerassi's Science-in-Theater plays, and concludes that "theater can play a vital role in helping us understand our encounter with the increasingly urgent questions and issues posed by science" (Shepherd-Barr 2006, 218). She even goes so far as to argue that no other genre "has seen such a powerful meaning of the two cultures of science and humanities" (Shepherd-Barr 2006, 1).

Shepherd-Barr considers the performative aspect of science plays particularly significant with regard to their potential to bridge the (alleged) gap between the Two

Cultures: "They literally *enact* the idea that they engage, a performativity that is provocative and innovative […]" (Shepherd-Barr 2006, 6). This characteristic of science plays aligns with C. P. Snow's vision of the productive potential of the Two Cultures as "the clashing point of two subjects, two disciplines, two cultures (…)" which "ought to produce creative chances" (Leavis 2013, 16). As an example for the performative quality of science plays, she highlights the critically acclaimed play *Copenhagen* (1998) by Michael Frayn which she deems performative "in the classic Austinian sense that they do the thing they talk about; they bring into being a material enactment of an abstract idea under discussion through a speech act" (Shepherd-Barr 2006, 35).

Curiously, Shepherd-Barr does not consider Djerassi's Science-in-Theater works to be appropriate representatives for successful science plays because their science is allegedly "superficially imposed on the play[s], so that the science and the theatricality bear no relation to each other and are not interdependent" (Shepherd-Barr 2006, 36) – an assessment which motivated Djerassi to write a rather passionate rebuttal about Shepherd-Barr's alleged bias against his literary works[21]. While I consider it arguable whether Shepherd-Barr has a point regarding her exclusion of Djerassi's plays from her definition of science plays and their (lack of) success of integrating science into drama, I certainly contradict her with regard to the gender-performative quality of Djerassi's plays – an aspect which she fails to include in her assessment.

Djerassi's Science-in-Theater plays go beyond the familiar issue of negotiating the relationship of the Two Cultures – in their integration of gender into science plays, they are pioneering. Djerassi's dramatic works function as speech acts in the Austinian sense as they "do things with words" and perform gender-specific aspects of science on stage, with the immediacy and liveness that only theater can procure. In this context, the performativity of drama and the performativity of gender are closely connected. As philosopher Judith Butler argues in *Gender Trouble: Feminism and the Subversion of Identity* (1990), gender is "a set of repeated acts within a highly rigid regulatory frame that congeal over time to produce the appearance of substance, of a natural sort of being" (Butler 2006, 45). In other words, gender identity is the result of repeated performative acts and thus, identity is "performatively constituted by the very 'expressions' that are said to be its results" (Butler 2006, 34).

Applying this theory to Djerassi's novels and especially his plays, his scientists construct their identity as men *and* as scientists by repeatedly performing normative

[21] cf. Djerassi, Carl. 2007. "When is Science on Stage really Science?". *American Theatre*. Vol. 24 (January 2007). pp. 96 – 103.

manhood acts, as I have explored in chapter 2 of this thesis. When performativity of gender meets performance on stage, the significance of gender in science becomes particularly clear. Theater performance allows the spectator to experience gender-specific acts, for instance masculine dominance behavior, in real time, including facial expressions, gestures, and tone. The audience observes how science is in fact not an objective and gender-neutral space but instead, gender permeates the culture of science on virtually all levels.

Djerassi's plays as closet dramas?

Despite being a theater enthusiast and playwright taking pride in the numerous productions of his plays, Djerassi's interest ultimately increased in plays that are "intended for reading rather than just theatrical performance" (Djerassi 2012, vii). Ingrid Gehrke considers Djerassi's shift towards closet dramas one of the final stages in his literary career, highlighting even more strongly the didactic function of these plays (cf. Gehrke 2008, 169). Along these lines, Djerassi has expressed his hope that, for instance his play *An Immaculate Misconception*, will also be read as a text as the play's book versions "could well serve as a text book in which some key issues in contemporary reproductive biology could be played out by the students in some biology classes" (TMP 267). Once again, Djerassi's goal to bridge science and literature becomes evident, using this connection as a means to foster meaningful discourse within a dialogical framework. By integrating science education within a dramatic text, Djerassi productively adds to the Two Cultures discourse, proposing alternative modes of science education which potentially spark discussions about the cultural implications of science. This aspect will be revisited later in this thesis when I investigate the critical potential of Djerassi's literary works in secondary education.

The fact that Djerassi's dramatic texts as such offer ways of enlightenment without performance does not mean that Djerassi's plays should be predominantly understood as so-called 'closet dramas' – literary works in a drama-specific form written to be read, solitarily or in small groups, rather than to be performed (cf. "Lesedrama", *Metzlers Literaturlexikon* 1990, 265). Historically, the emergence of the closet drama served as a means to avoid censorship – particularly when addressing politically charged and potentially controversial issues, as English professor Marta Straznicky notes (cf. Straznicky 1998, 146). For women writers of drama, especially during the Renaissance period, the closet drama provided the opportunity to fight

their obstacles "as vocal women in a patriarchal culture" (ibid.). Although not intended for performance, the closet drama provided a space for women's voices to be heard in environments that were hostile to women's viewpoints.

Against this historical backdrop I do not consider Djerassi a typical representative of the closet drama. However, his plays share a key characteristic with closet dramas – like the female writers in the past who used the closet drama to smuggle their political opinions into the minds of their readers, Djerassi smuggles the issue of gender in science into the minds of a wider public. By giving fictional women in science an independent voice in the male-dominated culture of the natural sciences, he echoes this tradition – an aspect which will be explored in greater detail in chapter 4 of this thesis.

Elements of theater performance

As this thesis focuses on an analysis of Djerassi's literary texts, it does not include the analysis of a particular production of one of his plays. Nonetheless, I would like to briefly highlight the gender-critical potential of staging Djerassi's plays. As I have shown, a stage performance offers a level of immediacy which the written text cannot provide – the theater functions as a space producing 'real' dialog, for instance through immediate feedback by the audience. The performance of a play includes verbal and non-verbal elements – of course, the written text contains these elements as well but it does not present them in a similar manner. Drama scholar Manfred Pfister refers to these elements as "multimedial forms of presentation" in drama, including channels and codes, like acoustic and visual codes (cf. Pfister 1988, 6 f.) which are integrated into the dramatic text as "a system of interdependent structural elements" (Pfister 1988, 9). Contrary to the relatively fixed element of the drama as a written text, the realization of a dramatic text on stage is highly variable (cf. Pfister 1988, 7). The characters and setting in a play – functioning as fictional senders of information – are key structural elements as well. As part of a system of interdependent structural elements of the dramatic text, these different elements result in the circumstance that "the multimedial dramatic text contains more information than the literary text" (Pfister 1988, 10).

A meaningful element in the staging of Djerassi's plays is, for instance, the use of a video display. The stage directions in *An Immaculate Misconception* require video elements to show the ICSI procedure to the audience, which, in real life, is conducted

under the microscope and connected to a monitor. In this way, Djerassi educates his audience about a reproductive technique by the use of a visual element. Given the fact that probably the majority of his audiences have not witnessed an ICSI procedure, this element of science education on stage of course also raises the level of interest and entertainment. Djerassi hereby follows Horace's aforementioned principle from *Ars Poetica* which he oftentimes refers to as his self-imposed mission: "*Lectorem delectando pariterque monendo* [delighting the reader at the same time as instructing him]" (TMP 245).

Apart from Djerassi's signature 'smuggling' of science education, the use of this particular video element stresses ethical and feminist issues in *An Immaculate Misconception*. In the scene in which Laidlaw fertilizes her own egg, the visualization of the act of fertilization on a monitor – taking a singular sperm and actively inserting it into her ovum in the Petri dish – not only draws attention on the ethically charged issue of 'playing God' but also on Laidlaw's feminist agency. Her newly developed reproductive procedure enables her to take matters, quite literally, into her own hands. She actively causes the existence, emergence, and development of her own child – and the audience observes her actions in the process. In ICSI, the ovum as the female part of human reproduction is usually the object of the reproductive technique – Laidlaw, as the scientist conducting the experiment, exerts power over her own biological material, thereby challenging the objectification of women's bodies in reproductive technology. The video display in this scene subverts the patriarchal narrative and emphasizes Laidlaw's power in reclaiming reproductive autonomy.

Moreover, Djerassi pushes formal boundaries of the genre of drama. Repeatedly, he challenges structure of the classical drama by disregarding the classical Aristotelian unities of time, place, and action. *Oxygen*, for instance, has two strings of action on two different time levels, emphasizing Djerassi's comparison of 'then' and 'now'. *Phallacy* includes sudden changes of locations and even scenes in which the stage is divided into two parts with two parallel actions. Ingrid Gehrke observes that this staging highlighta the juxtaposition of the two disciplines – science and art history (Gehrke 2008, 192). I would further argue that it emphasizes the significance of multiperspectivity in science – an aspect particularly relevant to discussions of gender in science. Ultimately, the juxtaposition of the two disciplines on stage is dissolved and the two allegedly contrary entities – the Two Cultures – begin to move towards one another, leading to first attempts of collaboration between Leitner-Opfermann and Stolzfuss.

Most significantly, Djerassi leaves both his plays *An Immaculate Misconception* and *Oxygen* open-ended. By doing so, he disregards the common characteristics of plays with closed endings – those that provide answers to all open questions, solve all discrepancies of information and, as a result, guide the audience toward a definitive interpretive perspective (cf. Pfister 1988, 96). Instead, Djerassi's plays implicitly delegate the solution of the conflicts on stage to the audiences. His path to knowledge leads from questions to more questions – rather than providing clear-cut answers, the plays emphasize the multiperspectivity and dialogism within the sciences, challenging the audiences to embrace the inherent 'gray' areas in science.

4 Gender in Science in the Past and Present, in Fiction and Reality: The Feminist Potential of Carl Djerassi's Literary Works

In the previous chapters I have explored the distinctly masculine (tribal) culture in the sciences in Carl Djerassi's literary works and investigated how the female characters adapt to their male-dominated environment. But how do these fictional worlds relate to reality? As outlined in the introduction, Djerassi attests his literary works a specific relationship to 'real' science – not only is the science portrayed in his novels and plays "impeccably accurate or at least plausible" (Djerassi 2005), also his portrayal of the sciences as a gendered culture and the oppression of women in science represent past and present realities. As a clansman of the science tribe, the former scientist Djerassi blurs the boundaries of fiction and reality with his literary works. While the strategies of his female protagonists should not be perceived as operative instructions, it remains valuable to explore how Djerassi's fictional worlds resonate with the realities of women in science.

In this chapter, I will examine the historical and present realities of women in science with a particular focus on their institutionally enforced lack of access to science and science education. Subsequently, I will investigate the role of Carl Djerassi's literary works in the context of feminist efforts to improve the position of women in science, particularly with regard to the concept of male feminist allyship.

Historical dimensions of gender in science

In her brilliant book *Has Feminism Changed Science?* (1999), Stanford science historian Londa Schiebinger explores the history of women in science in the context of an analysis of the masculine culture of the sciences. Schiebinger demonstrates how the underrepresentation of women in science can substantially be traced back to two factors: firstly, the lack of women in science at the time of the professionalization of science, and secondly, the gender-specific division of the public sphere and the private sphere, with the women firmly situated in the latter. The public sphere, belonging to the men, was associated with rationality, objectivity, and the discovery of new knowledge, while the women in the private sphere were assigned the tasks of caregiving, domestic and emotional labor. Following this biologically deterministic notion, women were considered unable to contribute to intellectual achievements, including science.

The history of science is thus, without exaggeration, a history of men. Over centuries, women have been excluded from doing science, as Schiebinger explains:

> [M]odern science is a product of hundreds of years of active shunning of women […]. Women should not be expected to succeed happily in an enterprise that at its origins was structured to exclude them. […] [H]istorically, women as a group were excluded [from science] for no reason other than their sex. (Schiebinger 1999, 11)

In an attempt to debunk the misogynist notion of an alleged biological inability of women to do science, it became a crucial task of the women's movement in the 1970s to recover "the accomplishments of great women scientists – from Hypathia, the renowned mathematician of ancient Greece, to Marie Curie" (Schiebinger 1999, 21). This included an increase of biographies of significant female scientists "who defied convention to claim a prominent position in an essentially male world" (Schiebinger 1999, 24)[22]. As these biographies highlight, the main obstacle of the historical female underrepresentation, or rather, non-representation, in science lies in the lack of access to spaces producing scientific output – or as Schiebinger puts it: "Without proper training and access to libraries, instruments, and networks of communication, it is difficult for anyone – man or woman – to make significant contributions to knowledge." (ibid.)

Ultimately, the institutionalization and professionalization of science in the late 18th and early 19th century led to its gendering as a *masculine* discipline. While many – probably men – viewed professionalizing science as "the second scientific revolution" (Beer & Lewis 1063, 764), it meant the end of virtually all scientific activity for most women. In Enlightenment Europe, the "theory of sexual complementarity" (Schiebinger 1999, 70) became increasingly popular. Women were considered inherently different, in fact *complementary* to men, thus the idea of equality – represented, for instance, in the emblematic phrase 'all men are created equal' in the US-American Declaration of Independence – simply did not apply to them. Philosophical big shots like Georg Wilhelm, Immanuel Kant, and, as I have already mentioned, Jean-Jacques Rousseau were strong supporters of this theory. Schiebinger explains:

> […] women were not to be viewed merely as inferior to men but as fundamentally different from, and thus incomparable to, men – physically, intellectually, and morally. The private, caring woman emerged as a foil to the public, rational man. As such, women were thought to have their own part to play in the new democracies – as mothers and nurturers. Complementarians sought to eliminate competition between men and women in the public sphere by removing women from that sphere (ibid.)

[22] Schiebinger provides a detailed list of biographies of female scientists. For further reading see Schiebinger 1999, 206.

Following this framework of complementarity, women were considered incapable of doing science since their alleged strengths – the emotional, the caring – were "portrayed as personal failings of women in the world of science" (ibid.) and stood in sharp contrast to "the abstract and universal" in research (Schiebinger 1999, 71). Consequently, the alleged *nature* of the woman prohibited her from doing anything connected to the (masculine) public sphere – and she was expected to remain in the (feminine) domestic sphere, where she naturally belonged. The impact of the theory of sexual complementarity was – even today, still is – tremendous. Women were forced from the scientific programs at the newly formed universities and until today, they have not reached equality in scientific research.

This separation of the two spheres in the Enlightenment period mostly applied to middle-class Europeans. Among the women who were denied access to science education in the 18th century, it was only wealthy women who had at least some opportunities to 'do science'. Wealthy women in e.g. Paris built "noble networks" in which they "exchanged social prestige for access to scientific knowledge" (Schiebinger 1999, 27). As Djerassi examines in *The Bourbaki Gambit* – and as I have analyzed in detail in Chapter 3 of this thesis – the scientific salons were a prime example of these networks. While their wealth gave these women power to fight at least some of their innate discrimination as women, there were limits to their battle: "Just as privilege gave women only limited access to the political power and the throne, nobility gave them only limited access to the world of learning" (ibid.).

Excluded from scientific institutions like the Royal Society of London or the Académie Royale des Sciences of Paris, women heavily relied on the men in their environments to gain access to scientific knowledge. As Schiebinger notes, "their relationship to knowledge was inevitably mediated through men, whether those were their husbands, their companions, or tutors" (ibid.). Much like in *Oxygen*, the wives of the 18th century scientists in the play are crucial to their husbands' professional success – yet, at the same time, their impact highly depends on their husbands' benevolence. Even the often-cited example of a successful woman in science, Marie Curie, who – unlike many other women in science – did in fact receive recognition for her scientific achievements, was only allowed to teach at the Sorbonne after her husband's unexpected death, effectively replacing her husband as professor (cf. Schiebinger 1999, 30). The 18th century reality of women in science was highly coincidental and emphasized the limits of women in a culture which generally considered them secondary at best.

Unsurprisingly, the all-male take-over of the sciences in the 18th century and the active shunning of women in science has resulted in a distinctly *masculine* culture. Nevertheless, many (male) scientists would likely reject this assessment as it contradicts the notion of the sciences' alleged objectivity. Ironically, some of the most influential philosophers actually argued *for* connecting the concept of objectivity to gender – Schiebinger examines the examples of Immanuel Kant, Sir Francis Bacon, and Karl Joël, who promoted a distinctly *masculine* philosophy. 20th century philosopher Georg Simmel even "argued that objectivity, though seemingly applying to humanity, was in fact an attribute of masculinity" (Schiebinger 1999, 69). In 1993, *Science* magazine posed the question "Is there a female style in science?", implying not only that science has a gender but that, in fact, it is male (or, more precisely, masculine) – and that the feminine – or non-masculine – is considered a deviation from this norm.

Predictably, numerous gender-focused projects in history and the social sciences have demonstrated the significant impact of (unconscious) gender-bias on the realities of women in science. One of the most prominent examples is the 1957 study of the famous anthropologist Margaret Mead and her colleague Rhoda Métraux entitled "The Image of the Scientist among High School Students", published in *Science* magazine, in which Meade and Métraux asked high school students to write essays about their perception of a scientist and the sciences. The study finds that to the students, "[t]he scientist is a man who wears a white coat and works in a laboratory", is "elderly or middle-aged" and may "wear a beard, may be unshaven and unkempt" (Mead & Métraux 1957, 386 f.). Moreover, a scientist is highly educated, "a very intelligent man", to some even "a genius" (Mead & Métraux 1957, 387). Regarding a scientist's work ethic, the students diagnosed "[h]e is a dedicated man who works not for money or fame or self-glory, but – like Madam Curie, Einstein, Oppenheimer, Salk – for the benefit of mankind and the welfare of his country" (ibid.). Yet, not all assessments were this positive – other students attested a scientist to be "so involved in his work that he doesn't know what is going on in the world. He has no other interest and neglects his body for his mind" (ibid.). Regarding family life, the students believe that a scientist "neglects his wife", "never plays with his children" and "is never home" (ibid.).

Clearly, the students' image of a scientist is highly impacted by gender-specific constructs – to them, not only is a scientist male, he displays characteristics and patterns of behavior historically connected to men, such as professional success, shaping the knowledge of the world, and a disregard of domestic work and caregiving.

Even more, Mead and Métraux found that the students' image of a scientist was impacted by their own gender:

> It divides girls and boys. The boys, when they react positively, include motives which do not appeal to the girls – adventure, space travel, delight in speed and propulsion; the girls, when they react positively, emphasize humanitarianism and self-sacrifice for humanity, which do not appeal to the boys. The girls reject science, both as a possible form of work for themselves, […] and for their husbands, because it will separate them, give their husbands absorbing interests which they do not share, and involve them in various kinds of danger. (Mead & Métraux 1957, 387)

Mead and Métraux demonstrate that the image of a scientist by high school students is not only inherently gendered, but that gender significantly shapes the attitude of young individuals towards science and scientists. Given that this survey was conducted in the 1950s, its outcome is of course a testament of its time as the number of women in science declined during that period (cf. Mattfield & Van Aken 1965, 142). Nowadays, one might expect high school students to express less traditional notions of gender roles in the sciences, as more women have found their way into the sciences.

Yet, research consistently shows that the majority of children still consider scientists to be male. A prominent example is the so-called "Draw-a-Scientist" test: First conducted by sociologist David Wade Chambers between 1966 and 1977, the study shows how children from kindergarten to grade five in the US, Canada, and Australia gradually develop the stereotypical image of a male scientist. The results of the first study show that most drawings of kindergarten and grade one students displayed none of the indicators of the standard image of a scientist, which Chambers based on the above-mentioned findings of Mead and Métraux (Chambers 1983, 259). But beginning in grade two and gradually developing, the children incorporated indicators for the traditional character of the scientist. By grade five, virtually all students displayed a stereotypical image of a scientist. Again, gender was a significant indicator: "Only girls drew women scientists. Twenty-eight women scientists were drawn, all by girls" (Chambers 1983, 261). Notably, the total number of students who took the test was 4807, resulting in 0.58 % of all students to draw a female scientist.

The "Draw-a-Scientist" test has been repeated many times since 1985 and it has been shown that, over time, the percentage of students drawing female scientists rose to 28% on average (Miller et al. 2018, 1947). Girls on average drew 58% of scientists as male, whereas boys drew 96% of scientists as male. The older the students were, the more frequently they drew male scientists: "By age 16 (high school), girls on average drew 75% of scientists as male. In contrast, for boys, the mean percentage of male scientists changed from 83% to 98% between the ages of 6 and 16" (Miller et al. 2018,

1950). Even in a 2024 study with undergraduate science students, merely 27.3 % of the drawings showed female scientists – none of which were drawn by a male student (cf. Crump 2024).

These results demonstrate that the perception of scientists of children and young adults is based on internalized gender-specific norms and not on a natural understanding of the scientist as male. In fact, the notion of the natural sciences as a discipline for men – and not for women – grows stronger the older the students become (ibid.) Given the large numbers of students drawing male scientists, it is unsurprising that nowadays, women in science are still remarkably underrepresented compared to their male counterparts. As Chambers emphasizes, the drawings produced in the "Draw-a-Scientist" tests are not simply children's images of a scientist – it "is the image inevitably drawn by adults who wish to convey graphically the concept 'scientist'" (Chambers 1983, 256). Indeed, Chambers argues, "it should be no surprise that, when asked to 'draw a scientist', even scientists themselves utilize the standard image" (ibid.).

Recent research in archeology has shown how gender roles have an impact not only on *how* science is done but on scientific knowledge itself. Anthropologists Cara Ocobock and Sarah Lacy from the University of Delaware have recently falsified the common claim of gender-specific division of labor in prehistoric times. In their 2024 paper "Woman the Hunter: The Archaeological Evidence", published in the journal *American Anthropologist*, they consider the image of "Man the Hunter and Woman the Gatherer" an "assumption with little supporting evidence" as women are "well-suited to endurance activities like hunting" and probably were hunters in the Paleolithic, like the males (Ocobock & Lacy 2024, 7). Ocobuck and Lacy point out that the misconception of gender roles in the Paleolithic – ironically, an alleged fact often used to legitimize present-day gender roles – reflect "a failure to question how modern gender roles color our reconstructions of the past" (ibid.). In other words, the anthropologists who originally made the "Man the Hunter and Woman the Gatherer" hypothesis projected their own gender-specific concepts onto prehistoric men and women, proving how the allegedly objective sciences can be significantly impacted by gender bias.

In light of prevailing images of scientists, what is the current situation of women in science? In her foreword to Claudine Schmuck's 2017 comprehensive study *Women in STEM Disciplines* on the empirical realities of women in science, technology, and engineering, Mari Noëlle Jégo-Laveissière, engineer and businesswoman, states that "women still remain a minority in STEM sectors and disciplines" (Schmuck 2017, vii). She identifies two major reasons for this lack of female participation in STEM: "orientation and employment" (ibid.). When choosing a field of study, women far less frequently opt for STEM disciplines compared to their male counterparts: "[O]ver the past 10 years, the proportion of women among STEM graduates hasn't made much progress, gaining only four points to reach 34% recently" (ibid.). Even when women graduate with a degree in a STEM discipline, "it's the school-to-work transition that is not favorable to women" (Schmuck 2017, viii).

Like Schiebinger, Schmuck uses the concept of the "leaky pipeline" (Schmuck 2017, 2) to describe the lack of participation of women: "It begins right after elementary school and continues until retirement." (ibid.) In other words, once children reach prepubertal age, in which gender-specific notions increasingly play a role, girls gradually drop out of STEM disciplines. Schmuck refers to the report of the 2009 DG Research from the European Commission entitled "Women in Science and Technology" which investigates the reasons behind the pipeline problem in STEM. Firstly, the percentage of women in the research of STEM disciplines only amounts to 35% in Europe; the United States of America show similar numbers (cf. ibid.). The second issue is turnover – many women leave the STEM workforce due to a

> lack of career management (lack of promotion, gender imbalance in salary) […], the impossibility to achieve work/life balance, the state of equilibrium between work and private obligations, particularly following the birth of a child […], and an "unfriendly" environment where women are few, which leads to isolation and then exclusion (Schmuck 2017, 2).

Clearly, gender-specific challenges of working in a male-dominated field negatively impact women's career choices, making STEM disciplines unattractive to them. The masculine culture of the sciences is an unwelcoming, even hostile environment to women. Given these realities, women can either choose to adapt and become the "Superwoman", to whom Schiebinger refers as "the highly organized, efficient, professional woman" who is "also a loving wife and perfect mother" (Schiebinger 1999, 95) – or not even try in the first place. Issues like the compatibility of family life

and a scientific career have not been deemed relevant by male scientists in the past as the patriarchal system of the sciences – and society in general – assigned these tasks to the women who remained in domesticity and/or more common professions for women.

How have women navigated the masculine culture of the sciences so far? Schiebinger notes that being a woman in science often means living "in two worlds – the world of science and the world of womanhood" (Schiebinger 1999, 68). Women do not have a choice whether they conform to the masculine code of conduct or not. Since masculinity and stereotypically masculine behavior are the norm in the sciences – and womanhood and femininity are considered a deviation of this norm – "women […] often assimilate or are assimilated to masculine codes of honor" (Schiebinger 1999, 77). Schiebinger highlights examples of famous female scientists, including Marie Curie, Lise Meitner, and Rosalind Franklin, who deemed "shedding the trappings of 'femininity' […] necessary for a woman to be taken seriously as a scientist" (Schiebinger 1999, 76).

The issue of motherhood – a recurring theme in Djerassi's literary works – serves as a prime example for this. In a male-dominated culture, fundamentally shaped by competition, taking time off to have a child often seems impossible and even absurd, revealing how the culture of science is inherently structured by men for men. Schiebinger refers to cases of female scientists who precisely time their pregnancies in order to fit them perfectly into their careers. Some female scientists in academia would take a well-timed sabbatical or research (not maternity) leaves, including Londa Schiebinger herself (cf. Schiebinger 1999, 95), whereas others would give birth and return to work more or less immediately, "without a pause in productivity, without appearing different from their male colleagues" (ibid.). In the scientific world, as Schiebinger points out, femininity – and anything connected to it, such as a feminine outward appearance or a visible pregnancy – is a competitive disadvantage, which she considers a crucial reason for the underrepresentation of women in science.

Schiebinger makes useful suggestions to improve the compatibility of the sciences and family life – such as adjusting the tenure clock, granting tenure for part time positions, or splitting a single assistant professorship position into two half-time positions (cf. Schiebinger 1999, 102). However, these suggestions only treat the symptoms, not the cause of the problem. More importantly, this thesis does not aim at presenting solutions to the problems caused by the male-dominated culture of the sciences. Still, understanding the role of gender in science is "crucial for both

mobilizing human resources and for bringing new perspectives, priorities, and creative ferment to science" (Schiebinger 2002, 480).

The power of (and desire for) participation is what sociologist Aladin El-Mafaalani's refers to as 'having a seat at the table', a sociological metaphor referring to the dynamics of inequality in society in the context of migration and identity politics (El-Mafaalani 2019, 42, translation DSS). The table represents the realm of power and impact, occupied mostly by white men, while the floor is assigned to all other individuals – women, POC, individuals of the LGBTQ+ community, individuals with disabilities, *et cetera*. Applying this metaphor to women in science, women were refused to even sit at the metaphorical table, representing the scientific culture, and were forced to remain seated on the floor or at a side table as bystanders, observers, outsiders – or even servants. It was not until the 20th century, that (some) women were finally allowed a seat at the table – as guests, not regular diners. Following El Mafaalani's metaphor, once some women have obtained a seat at the table, they quickly realized they do not like the cake the powerful were eating. The cake – representing the cultural norms of the sciences, its code of conduct, et cetera – was created to match the taste of men. Thus, from the perspective of women in science, the *recipe* of the cake has to be altered to match their gender-specific needs and facilitate true gender equality in science.

For women in science, adjusting the 'recipe' in order to establish change in the scientific community requires "deep structural changes in the culture, methods, and content of science" (Schiebinger 1999, 12). According to Schiebinger, political and academic initiatives have so far not brought the desired success "because they are based on impoverished understandings of the processes involved" (ibid.). This includes an understanding of the structural neglect – even total exclusion – of women in the sciences. Framing the lack of representation and lack of success of women in the sciences as a problem of the individual woman not only reveals a lack of knowledge of historical facts, it does not take into consideration the heavy burden of the underrepresentation of women in the sciences over centuries on female scientists today. In other words, succeeding in a world that historically had – and often still has – no intent to include women, is an extremely demanding undertaking. In fact, it requires support – by *male feminist allies*, for instance, who use their influence and power to support women in the sciences.

Defining allyship

Both as scientist and as author of literary works, Djerassi has been labeled a supporter of women and women's rights – journalist Karin Steinberger even called him the "man who freed women"[23] (translation DSS). Assigning a man the task of 'freeing' women is highly problematic – and I am confident that many feminist scholars would agree, as this notion entirely overlooks the importance of empowerment of women. Contrary to popular belief, men cannot empower women – empowerment can *per definitionem* only derive from the suppressed individual. In general, it can be defined as

> the capacity of individuals, groups, and/or communities to take control of their circumstances, exercise power and achieve their own goals, and the process by which, individually and collectively, they are able to help themselves and others to maximize the quality of their lives. (Adams 2017, 17)

If Djerassi cannot empower women, which role do his literary works play in a greater feminist framework? What is the role of men like Djerassi who aim at supporting and strengthening the position of women in general, or more particular, in science? The concept of *male feminist allyship* offers a constructive alternative to a patriarchal masculinity. Allyship has recently become a buzzword in social activism, antiracism, as well as in gender studies and queer studies – yet, the concept itself is certainly not new. One of the oldest examples of a white ally is abolitionist John Brown who, during the antebellum era, initiated a slave revolt, for which he was tried and executed by the Commonwealth of Virginia in 1859. Another – very prominent, yet fictional – example of a white ally would be lawyer Atticus Finch from Harper Lee's 1960 novel *To Kill a Mockingbird* who defends Tom Robinson, a Black man falsely accused of raping a white woman.

Nonetheless, it was not until the early 1990s, that the concept of allyship gained real momentum in the LGBTQ+ movement. In their 1991 essay "Becoming an Ally", Jamie Washington and Nancy J. Evans discuss the concept of allyship in the context of the political and social oppression of members of the LGBTQ+ community – this text is considered one of the first academic examination of concept of allyship. Even though Washington and Evans do not explicitly touch upon feminist allyship, their thoughts on allyship are equally applicable to other manifestations of oppression besides LGBTQ+ discrimination. Washington and Evans define an ally as a "person who is a member of the 'dominant' or 'majority' group who works to end oppression in his or

[23] Karin Steinberger. 2001. "Der Mann, der die Frauen befreite." In: *Süddeutsche Zeitung*, 03.03.2001. < https://www.djerassi.com/german12/> Last accessed 25 February 2025.

her personal and professional life through support of, and as an advocate with and for, the oppressed population" (Washington & Evans 1991, 195). Due to the hierarchical power relations in society, the support of members of the dominant group often has much more significant impact than the activism of the oppressed group (cf. ibid.).

Washington and Evans emphasize that the first step to becoming an ally is recognizing one's privilege – and that developing this level of awareness "is often the most painful part of the process of becoming an ally" (Washington & Evans 1991, 196). Being an ally includes more than "being a caring, liberal person who feels we are all created equal and should be treated as such" (Washington & Evans 1991, 197) – as Washington and Evans, among others, point out, allyship requires *taking action*. An ally has "to realize that although equality and equity are goals that have not yet been achieved, and that she or he has a role in helping to make these goals realities" (ibid.).

Considering that the concept of allyship was in its initial stages in the early 1990s, Washington and Evans present a rather hands-on, practical approach to allyship, providing concrete examples for allyship in action. These include, *inter alia*, "listening to gay, lesbian, and bisexual students in a nonjudgmental way and valuing the unique qualities of each individual", the use of "non-exclusionary language", or "sensitivity to the possibility that not everyone in a student organization or work setting is heterosexual" (Washington and Evans 1991, 199). Furthermore, being an ally can also mean "making sure that issues facing gay, lesbian, and bisexual students and staff are acknowledged and addressed", for instance through "inviting speakers to address topics relevant to the gay, lesbian, and bisexual community" (ibid.). Of course, structural support, such as "[a]ntiharassment policies" and "antidiscriminatory hiring policies" need to be implemented as well (ibid.).

Washington and Evans define four levels of allyship: awareness (both of oppression and one's own privilege), knowledge/education (about the realities of the oppressed group), skills (in communicating the acquired knowledge), and action, which they identify as "most important" and "most frightening step" since it is "without a doubt, the only way that we can effect change in the society as a whole" (Washington & Evans 1991, 200). If an ally reaches the fourth level, Washington and Evans promise rewarding benefits of being an ally, for instance, the opportunity to "learn from, teach, and have an impact on a population with whom you might not otherwise interact" (Washington & Evans 1991, 203). Clearly, the advocates of the fairly new concept of allyship considered it relevant to emphasize the opportunistic aspects of being an ally which from today's perspective might appear odd.

In recent years, there has been an increased interest in the concept of allyship as a response to, *inter alia*, sexism, racism, ableism, and discrimination of members of the LGBTQ+ community. Especially to younger population groups, such as the so-called 'Millennials' and 'Gen Z', allyship has become a central issue in social justice activism. Significantly influenced by the murder of African-American George Floyd by white police officer Derek Chauvin on May 25, 2020 in Minneapolis, MN, the following global protests by the Black Lives Matter movement called for the support of anti-racist allies among white, privileged individuals. As a consequence, the concept of allyship has found its way into different areas of everyday life: social activism, popular culture, even the corporate world. In 2021, the website dictionary.com chose 'allyship' as their Word of the Year as it "acts as a powerful prism through which to view the defining events and experiences of 2012 – and crucially, how the public processed them" ("Dictionary.com's 2021 Word of the Year").

In his 2022 monograph *Nontoxic: Masculinity, Allyship, and Feminist Philosophy*, philosopher Ben Almassi investigates the concept of male feminist allyship as a counterexample to patriarchal masculinity. His main argument is that men can make meaningful contributions for gender justice in the role of feminist allies. According to him, feminist allyship "seeks to upend masculinity as a received social category" and "can ground and give meaning to nontoxic ways of being man" (Almassi 2022, 6). Almassi defines allies as "non-beneficiary participants in social justice movements […] or members of dominants groups working with members of oppressed groups" (Almassi 2022, 7). Contrary to other scholars, Almassi uses the relational approach to the concept of allyship of Native American philosopher Andrea Sullivan-Clarke as it

> enables a more flexible and intersectional understanding of allyship; it underlines the importance of accountability and the risks that come with prioritizing self-ascribed or institutionally commodified "ally" labels over reparative and constructive allyship practices. (Almassi 2022, 7)

In this context, it is crucial to raise awareness of power relations – a good ally "neither dominates nor takes over a shared project" (Almassi 2022, 64). Almassi refers to bell hooks who emphasizes that "the goal is one of cooperation rather than domination" (ibid.). Allyship works in the context of a shared project, "meaning that an ally working with others values the project relationally" (ibid.) – the value of allyship lies, at least partially, in *shared* values, resulting in "an invested relationship" between the ally and the oppressed group (ibid.).

Given their dominant group membership, they are by definition privileged – at least in some contexts. *Intersectionality* plays a significant role here, as Almassi explains:

> [I]ndividuals can be members of dominant groups in one respect but not another, given the multiple systems of oppression predicated on race, class, colonialism, gender, sexuality, religion, and other aspects of human identities. Thus, members from different dominant groups still could be allies to one another provided that they also hold membership in a dominant group: for example, that Black men could be allies to white women in virtue of their gender while white women could be allies to Black men in virtue of their race. (Almassi 2022, 66)

Almassi notes that intersectionality is not to be understood as "narrowly additive conception of social oppression" (ibid.) – instead, intersectionality "affirms not only that people are oppressed in different ways but that the axes of oppression *intersect* in messy, complicated, not so easily disentangled ways" (ibid.). The relational approach allows for a more nuanced recognition of the dynamics of allyship practices (cf. ibid.)

How does male feminist allyship offer an alternative notion of masculinity as a counterexample to patriarchal masculinity? Almassi argues that male feminist allyship constitutes a "feminist allyship masculinity", which recognizes how "gender norms and configurations of masculinity and femininity undergird social oppression" and how men "both uphold oppressive systems and also […] contribute to dismantling them" (Almassi 2022, 67 f.). Male feminist allies acknowledge their gender-specific privilege – they try to become aware of how they "benefit from and are complicit in gender oppression while recognizing the meaningful contributions to undoing oppression that men have made historically and can make in going forward" (Almassi 2022, 68).

Of course, male feminist allyship is not uncontested, "particularly when it comes to men, white, straight, cisgender, upper-class people describing themselves as allies" (Almassi 2022, 71). In any case, ally "is best understood as a verb, rather than a noun, a sustained activity rather than a badge of honor" (ibid.) In this context, it is important not to overlook the power dynamics that have caused the very need for allyship action – consequently, a man should not be praised simply for his allyship practices. Former mayor of Baltimore Catherine Pugh has pointedly drawn attention on the aspect of responsibility of allyship action in the context of racism against Black people: "Racism is not mine, it's yours, and it's not called 'help' when it's your mess we're cleaning" (Pugh 2020, qtd. in Almassi 2022, 72). This statement highlights how the responsibility of dismantling the system of racism – and other systems of

systematic oppressions, like the patriarchy – relies on the *beneficiaries* of the system and not on the oppressed.

Djerassi as feminist ally?

What, then, does allyship action entail? As noted earlier, Washington and Evans provide several examples. More recently, sociologist Juliana Carlson and her colleagues have synthesized central elements of allyship. In their 2020 article "What's in a Name? A Synthesis of 'Allyship' Elements from Academic and Activist Literature", Carlson et al. analyze 40 academic and activist texts to unfold the current understanding of the concept of allyship. Carlson et al. identify eight prominent themes – in order of frequency of appearance, these are:

> Constant action of the "everyday ally"; prioritizing a structural analysis of oppression and privilege; non-self-absorbed and accountable self-reflection; amplify marginalized voices; welcome criticism and be accountable; listen+shut up+read; ally is not a self-adhesive label; and allyship: unlikely or undesirable? (Carlson et al. 2020, 891)

The manifestations of allyship action are obviously diverse and extend into different areas of society and the individual. While some characteristics of allyship are considered more significant and powerful than others, all of them are allyship action. For the purpose of my discussion of Djerassi's literary works as feminist allyship action, there are three elements that I consider particularly relevant: "prioritizing a structural analysis of oppression and privilege", "non-self-absorbed and accountable self-reflection", and "amplify[ing] marginalized voices" (ibid.).

Starting with the first, dissecting the dynamics of oppression and privilege includes, *inter alia*, strategies that further "the development of critical consciousness" and the "examination of the dominant/oppressed binary" (Carlson et al. 2020, 892). How does Djerassi accomplish this in his literary works? Embedded in the fictional worlds of his novels and plays, Djerassi reveals a detailed analysis of the scientific culture which is (seemingly invisibly) governed by gender-bias. As a (former) member, Djerassi has exclusive knowledge of this otherwise sealed culture and is therefore eligible to dissect the sciences' cultural pitfalls in a way that non-scientists might not be able to. In doing so, he risks repercussions from tribal members. As Djerassi himself remarks, the members of the science tribe are "generally reluctant to disclose their tribal secrets" (TBG 5, translation DSS). Consequently, washing dirty lab

coats in public (cf. STG 8, translation DSS) possibly comes at the price of professional debarment – or at least, conflicts with his fellow tribal members.

Djerassi views writing Science-in-Fiction as an exercise of introspection and self-analysis – an activity which, according to his experiences in the sciences, his (male) tribal members consider unnecessary (cf. STG 7). Standing in sharp contrast to the ability of scientists to dissect even the smallest components in their environment with great attention to detail, this skill is barely put to use for an examination of the self, so Djerassi claims (ibid.). Writing fictional texts about what it entails to be a scientist is what Djerassi calls "a kind of self-psychoanalysis", or "Auto-Psychoanalyse" in German (ibid.). While I argue that Djerassi's literary portrayal of the culture of the sciences is actually an analysis of power relations and gender-specific inequalities and not so much (self-)psychoanalysis, his introversive examination of the cultural norms of the sciences certainly requires self-reflection, a significant element of allyship in practice.

Most importantly, as my analysis in chapter 3 of this thesis has shown, Djerassi's literary works do what Carlson et al. call "to amplify marginalized voices" (Carlson et al. 2020, 891). In *Cantor's Dilemma*, Djerassi lets us observe lengthy conversations between female scientists about their gender-specific struggles in the 'old boys' club' of the sciences – and by adding the critical commentary of Leah Woodeson, contextualizes these issues from the perspective of the humanities. In *The Bourbaki Gambit*, Djerassi centers the readers' attention on Diana, the only non-scientist in the scientific collective, who repeatedly highlights the issue of gender bias in the sciences. In the play *Oxygen*, Djerassi and Hoffman let the wives of successful scientists advocate for their significant impact on their husbands' careers. With the character Melanie Laidlaw in *Menachem's Seed* and *An Immaculate Misconception*, we learn about the individual struggles of a female scientist – and ultimately, mother – who aims at 'having it all', yet reaches the boundaries of a female scientist in the male-dominated space of the sciences. In *NO*, Djerassi amplifies the voice of a multiply marginalized individual – by centering his tale mostly on the Indian-American scientist Renu Krishnan, he sheds light on the intersectionality of her struggle to be recognized in the relentless culture of the sciences. Finally, in *Phallacy*, Djerassi depicts how art historian Regina Leitner-Opfermann constantly has to fight back misogynist attacks, masked as scientific criticism, by chemist Rex Stolzfuss.

Of course, investigating Djerassi's role as a potential feminist ally to women in science must include a discussion of privilege. Like all of his male colleagues, Djerassi has benefited from patriarchal structures as a male scientist and as a male author.

Naturally, not all men are privileged in the same way – the experience of male privilege differs according to one's individual identity. Almassi refers to the image of a knapsack of privileges by feminist scholar Peggy McIntosh who describes it as "a collection of social privileges large and small that each man carries around with him, always there even when taken for granted by the recipient himself" (Almassi 2022, 76). For Djerassi, this means that he is uncontestably privileged not only as a man but as a, for instance, educated, highly successful man, as a wealthy man, as a cisgender, heterosexual man. At the same time, he lacks privilege regarding his Jewish heritage and his background as refugee and immigrant. Maybe it is exactly this experience of lacking privilege which has shaped his awareness of matters of inequality in science.

In this context, the question arises whether it is reasonable to praise the feminist contributions of a multiply privileged man like Djerassi while there are – and have been – many women who have significantly contributed to the critical discourse of women in science. The heightened attention drawn on men for their feminist allyship action is referred to as "the pedestal effect", where men who contribute to feminist issues "are frequently given more attention and respect, basically for saying the same things that women have been saying for years" (Messner et al. 2015, 138). Even though this reflects an unjust patriarchal side effect, it does not diminish the impact of male feminist allyship action. At the same time, as Djerassi's example illustrates, engaging in feminist activism is an "opportunity for men to put their privilege to good ends" (Almassi 2022, 96).

Male feminist allyship and male complicity in the oppression of women

Another aspect of criticism of male feminist allyship is the complicity of men in the patriarchal oppression of women. As Almassi highlights, emphasizing men's feminist allyship "risks erasing men's complicity with and responsibility for perpetration of past and persisting violence against women and other forms of gender oppression" (Almassi 2022, 73). In this context, it is secondary whether the acts of oppression of women by men were intentional or unintentional. Given the *structural* discrimination against women, it is virtually impossible for men – any men – to not have a part in female oppression. So, in which ways has Djerassi been complicit in oppressing women in science? For women in general, his involvement in developing the first contraceptive pill – and especially his framing of the pill as supporting women's sexual

freedom[24] – can certainly be understood as feminist allyship in science. Regardless, his scientific career is not immediately relevant for this thesis as my focus lies on Djerassi's feminist allyship *as an author of fictional texts*, not as a scientist.

Indeed, Djerassi's literary works include some stereotypical, potentially problematic representations of women in science. Despite his efforts to portray the women in his literary works as empowered, independent agents, they occasionally appear to merely exist in relation to their male partners. Despite their power over the outcome of the issues at hand in their roles as mediators and problem solvers, one should not ignore the fact that they handle problems their male partners have caused. The *emotional labor* – which the male scientists deem secondary or even irrelevant for their own scientific labor, yet which turns out to be crucial to the success of their careers – is assigned to the women. In other words, it is, at least implicitly, the women's job to 'clean up the messes' their men have created. Of course, pointing out such shortcomings is helpful – in some cases, the depictions are so blatantly obvious that they immediately catch one's attention. Nonetheless, these portrayals reproduce sexist notions of womanhood and traditional gender roles.

The manner in which the narrator in *Cantor's Dilemma* introduces the female characters to the reader can be seen as another instance of a sexist trap. The introduction of Jean Ardley – certainly one of the most interesting characters in the novel – focuses solely on her outward appearance:

> Jean Ardley was a short woman, on the plump side, who favored pants, because they were more convenient in the lab, and relatively high heels. […] Her blue eyes and the chameleonlike fashion with which her face changed were her best features. Blue eye shadow and long earrings were her only adornments; her fingers were ringless. (CD 43)

Ardley's outward appearance neither plays a role for her work as a scientist nor necessarily for the understanding of her portrayal in the novel – thus, this prioritization of the description of a (female) character's looks is surely problematic. Djerassi highlights his female characters' appearance in other works as well. In *The Bourbaki Gambit*, Diana Doyle-Ditmus is described as attractive and surprisingly youthful for her age (cf. TBG 7), whereas Charlea C. Conway is presented as her unattractive counterpart: "She wore absolutely no makeup; her hair seemed to have been cut by a man's barber. What a contrast to D3!" (TBG 56) Of course, the readers are objected to the perspective of Max Weiss, Diana's later husband, and therefore his physical attraction to her impacts his account of her. Still, as his evaluation of Charlea's

[24] Karin Steinberger. 2001. "Der Mann, der die Frauen befreite." In: *Süddeutsche Zeitung*, 03.03.2001. < https://www.djerassi.com/german12/> Last accessed 25 February 2025.

appearance shows, Max reproduces the notion that a woman's outward appearance is worth mentioning – he fails to overcome the patriarchal notion of assessing the physical appearance of a woman and her level of attractiveness in reference to patriarchal beauty standards.

In *Menachem's Seed*, the narrative voice assesses Melanie Laidlaw's physical appearance as attractive and conforming to beauty norms: "Firm to the touch and well proportioned, her muscles had, as they say 'definition'. There were no excesses where they mattered most: belly, thighs, buttocks, even her smallish, alpine breasts." (MS 17). More than once, the male characters in the novel compliment Laidlaw on her "great legs" (MS 53). These examples demonstrate that Djerassi's literary works show a male perspective – especially the descriptions of the private scenes of the female characters cannot conceal *the male gaze* in his works.

As already briefly examined in the previous chapter of this thesis, the male gaze is a concept from feminist aesthetics – more precisely, from film theorists and art historians – referring to "the frequent framing of objects of visual art so that the viewer is situated in a 'masculine' position of appreciation" (Korsmeyer and Brand Weiser 2021, qtd. in "Feminist Aesthetics 2021). In their feminist assessment of women's depiction in art and film, these theorists "have concluded that women depicted in art are standardly placed as objects of attraction […] and that the more active role of looking assumes a counterpart masculine position" ("Feminist Aesthetics" 2021). In other words, as film theorist Laura Mulvey puts it, "women are assigned the passive status of being looked-at, whereas men are the active subjects who look" (Mulvey 1989, qtd. in "Feminist Aesthetics" 2021).

This theory can also be applied to literary works, as the readers – depending on the narrative situation – can take on the perspective of the male gaze. For Djerassi's literary works, this might result in a sexual objectification of the women for the pleasure of men, even in allegedly 'objective' contexts like the sciences. In order to detect aspects of (subtle) gender bias, it can be useful to double-check similar representations of the male characters. Compared to their female counterparts, there are barely any descriptions of the outward appearance of the male scientists in Djerassi's literary works. In *Cantor's Dilemma*, when Cantor is first introduced to the reader, the narrator invests almost an entire page for a detailed account of his scientific and academic career (cf. CD 7 f.). In a similar manner, we are introduced to his assistant Stafford – the first description of him focuses on his strong work ethic and his high expectations of his graduate students (cf. CD 12).

Given Djerassi's self-identification as "male feminist"[25] (translation DSS), the discussion of his literary works needs to critically address how his portrayal of scientists conforms to gender stereotypes. As a (potential) feminist ally he should be held accountable for the areas in which he possibly failed as a (feminist) writer. At the same time, the goal cannot be to over-critically dissect each potential gender-specific lapse and only accept 'flawless' texts as appropriate feminist contributions. As my subsequent analysis will demonstrate, Djerassi's at times stereotypical depictions of men and women in science do not debilitate the critical feminist potential of his texts.

The feminist potential of Djerassi's Science-in-Literature

How, then, should we evaluate the potential of Djerassi's literary works as feminist allyship action? The point of feminist allyship is not that men who have been complicit in the oppression of women – intentionally or unintentionally – cannot become feminist allies. As Almassi points out, feminist allyship requires "doing the reparative work to rebuild what has been damaged or destroyed by [one's] own and other men's perpetrations of gender oppression" (Almassi 2022, 74). In other words, the fact that Djerassi himself has reproduced sexist notions in his literature shows that he himself is a product of patriarchal society and that he – despite his efforts to act as a feminist ally – sometimes fails. This does not diminish the negative effects of the above-mentioned instances of sexist representations of women – it is rather a question of *accountability*. Almassi quotes Smith and Johnson (2020) in order to underline the importance of accountability in the context of feminist 'reparative work':

> It means being accountable to our allies not only for the ways that we contribute to collective feminist projects, and not only for our bouts of bystander paralysis and other failures to act, but also for what we have done wrong, what we are still doing wrong now, and what we will do wrong in the future (Smith and Johnson 2020, 112).

Contrary to the vast majority of his peers in the sciences, Djerassi has used his impact as globally acclaimed scientist to draw attention on gender-specific inequalities in the sciences. Almassi alludes to this by quoting philosopher James Sterba who "urges feminist men to argue for gender equality in spaces in which women are underrepresented and to actively use their male privilege to advocate for gender

[25] Karin Steinberger. 2001. "Der Mann, der die Frauen befreite." In: *Süddeutsche Zeitung*, 03.03.2001. < https://www.djerassi.com/german12/> Last accessed 25 February 2025.

equality in conversations with those who extend greater credibility to men than women" (Almassi 2022, 94).

I argue that the critical potential of Djerassi's feminist allyship action lies in his readership. As Djerassi has made abundantly clear, his intention to write Science-in-Literature is to "smuggle" scientific knowledge, disguised as fiction (or drama), into the minds of non-scientists – or as Djerassi calls them, "scientifically illiterate" (Djerassi 2005). Even though Djerassi himself would probably firmly contradict, I consider the science portrayed in his literary works as secondary. Incorporating scientific facts and accessible explanations of complex scientific phenomena into his literary works surely serves a worthwhile pedagogical purpose – and marks a unique feature of Djerassi's oeuvre. Yet, I view his portrayal of the culture of the sciences – particularly the naivety of the (allegedly genius) scientists and their utter lack of awareness of the discursivity of science – as much more significant. As I have shown in great detail in this thesis, gender lies at the core of this as the characteristics of scientific culture can ultimately be traced back to *androcentric* norms.

Given Djerassi's high standing in the sciences, he was and still is able to reach his equally powerful peers with his literature. Judging from the reviews of his literary works in scientific journals, such as *Nature* and *Science*, these works have been widely read by fellow scientists. His novels and plays offer his peers the opportunity to dive into the possibly unfamiliar realm of literature and theater – thereby, his literary works have a significant impact on bridging the Two Cultures. Even more, apart from entertainment and aesthetic pleasure, Djerassi's novels and plays create fictional worlds mirroring realities of the sciences in the past and present – and potentially foster self-reflection on the part of the scientific readership. The lack of a critical examination of the culture of science is what Djerassi has consistently criticized. His Science-in-Literature works create the opportunity that (male) scientists read literature dealing with feminist issues who otherwise might not be subjected to feminist issues – or choose to pay no attention to them.

Generally, the problem of feminist literature is often its reach, as it is more or less exclusively read by feminists – and rarely by individuals with traditional, non-feminist attitudes and beliefs. Even more, men tend to actively *avoid* literature written by women. Research has shown that the readership of the ten most successful male authors, *inter alia* J. R. R. Tolkien, Charles Dickens and Leo Tolstoi, have a fairly balanced readership of 55 percent men and 45 percent women (Sieghart 2021, 147). In comparison, the ten most successful female authors, for instance Agatha Christie, Margaret Atwood, Suzanna Collins, or Corín Tellado, reach only 19 percent male

readers but 81 percent female readers (ibid.). Remarkably, the texts of these female authors are not even exclusively feminist texts. Quite fittingly, German-speakers might still be familiar with the infamous interjection by literary critic Marcel Reich-Ranicki at the 1977 award ceremony of the prestigious *Ingeborg-Bachmann-Literaturpreis*: "Who cares about what the woman thinks, what she feels, while she is menstruating? This is not literature – this is a crime." (*Süddeutsche Zeitung*, 22.06.2010, translation DSS). Of course, this is only anecdotal evidence, yet it certainly underlines the obvious aversion of many men towards literature by women and towards feminist issues in literature.

Against this backdrop, it remains doubtful whether a feminist text dealing with the marginalization of women in science would be read by a large number of male scientists – particularly the (male) leaders, the (male) powerful individuals, the (male) decision-makers in science. Disguised as entertaining literature on scientists and the world of science, Djerassi's literature urges its readership to reflect upon gender inequality in science, an aspect which male scientists possibly are not confronted with in their echo chambers – or actively choose not to. Thus, Djerassi's *modus operandi* of 'smuggling' not only takes place on a level of science education – he smuggles feminist discourse into the minds of his peers, the powerful men in science.

5 Conclusion: The Relevance of Djerassi's Literary Works

Science is a human endeavor; it must serve us all, including women and feminists.

- Londa Schiebinger (1999)[26]

In this thesis, I set out to explore the significance of gender in the selected literary works of Carl Djerassi. As a former chemist himself, Djerassi made it his mission to educate non-scientists about science through fiction – with his texts, he wanted to 'smuggle' scientific knowledge into the minds of the 'scientifically illiterate'. Yet, as my thesis has demonstrated, his literature goes far beyond science pedagogy – using his insider knowledge as a former scientist, his literary works amount to a detailed portrayal of the oftentimes hermetic culture of the sciences. In this context, gender is not only one of several cultural characteristics – as I have shown, it is the *defining* element of the culture of the sciences. The natural sciences depicted in Djerassi's literary works are practiced within a distinct, fairly restricted culture with *tribal* features. As a tribe, Djerassi's scientists can be understood as a social group with a specific code of conduct, predominantly governed by gender-specific attitudes which, disguised as rationality and objectivity, excludes women from the sciences.

Djerassi characterizes the culture of the sciences as governed by brutal competitiveness, driven by the inseparability of scientific success and priority of discovery, which is established through publication. As a result, there is a general lack of trust within the scientific community as trust can barely be afforded in the race to be first. Loyalty and trust are thus exclusive to research partners and become essential for the success of a scientific project. To a scientist, lineage and territoriality within the science tribe are particularly significant as they emphasize a scientist's affiliation with an academic institution and a scientific mentor. Among Djerassi's scientists, the mentor-mentee-relationship occupies a central role: scientific newcomers learn to navigate the ritualized culture of science and its rigid code of conduct from their mentors in order to become established and recognized scientists themselves.

In Djerassi's literary works, science is a men's world – a world created by men for men – with limited flexibility for any deviation from its prevailing definition of masculinity. Masculinity in Djerassi's literary works, especially in his plays, has a *performative* quality. The scientists perform manhood acts which prove not only that

[26] Schiebinger 1999, 184.

they are men but in fact that they are *scientists* as being a scientist is inextricably linked to gender. Given the fact that in Djerassi's literary works, the sciences as a culture are a distinctly masculine culture, the female scientists are forced to perform these acts as well, in order to blend in and be professionally successful.

Throughout his oeuvre, Djerassi's literary representations of the sciences repeatedly emphasizes how the sciences are a hostile environment for women. Thus, Djerassi's protagonists develop diverse strategies to prevail in a culture inherently ignorant of their needs. In the novel *Cantor's Dilemma*, Djerassi's first and programmatic literary work, we encounter Jean Ardley and Celestine Price, a female research team whose gender-specific skills, especially their ability of successful interpersonal communication, demonstrate a specific advantage for their scientific (team)work. Hereby, the female research team Ardley and Price is presented as counterexample to the dysfunctional male research team of Cantor and Stafford whose inability to communicate effectively and to set their egos aside existentially threatens their professional success. By contrasting the two research teams according to gender criteria, the novel emphasizes the impact of gender on the sciences as a culture – and ultimately, even on the scientific endeavor itself. The character Leah Woodeson complements the deconstruction of the cultural qualities of the sciences by adding the outsider perspective of the humanities, highlighting the absurdities of the specific code of conduct in the natural sciences.

My discussion of the novel *The Bourbaki Gambit* and the play *Oxygen* has demonstrated how Djerassi adds to contemporary feminist efforts of rewriting history by highlighting the achievements of female scientists which have so far been ignored or actively erased from the collective historical consciousness. Both literary works demonstrate how historically, the sciences have not been exclusively male realms but in fact that men excluded women from the sciences for political – and deeply misogynist – reasons. In *The Bourbaki Gambit*, Djerassi creates a modern-day salon, with Diana, the scientific outsider as the powerful *salonnière*, challenging the male scientists' narrow view on gender-specific issues in science. In *Oxygen*, Djerassi and Hoffman shed light on the significant impact of the wives of scientists on their husbands' scientific achievements. The readers/spectators of the play encounter historical figures, such as Madame Lavoisier, and observe the wives' fight for acknowledgement of their share in their husbands' work. By paralleling these 18th century figures and present-day members of the retro-Nobel committee, Djerassi and Hoffman emphasize the lack of substantial change regarding the (male) ignorance of female achievements in science across two centuries. As I have shown, both *The Bourbaki* Gambit and *Oxygen*

essentially argue against the predominantly androcentric culture in the natural sciences and relativize the myth of (supposed) male genius by having the female characters participate in – and even win – the serious games of competition in science.

With *Menachem's Seed* and its dramatic adaption *An Immaculate Misconception*, Djerassi presents a more nuanced and ambivalent example of a female scientist. Contrary to the aforementioned examples of women who outplay their male counterparts in virtually all aspects, Melanie Laidlaw shows highly problematic behavior in achieving her personal and professional goals. Yet, as my thesis has shown, these ethical gray areas open up space for critical discussion of the challenges posed by reproductive technology. Both works highlight crucial aspects regarding the intersection of science and gender: the incompatibility of a scientific career and motherhood, gender-specific inequality regarding contraception, androcentrism in scientific research on reproductive biology – and, ultimately, the destructive ego of Felix Frankenthaler, whose obsession with his own masculinity results in dramatically violating the reproductive rights of his research partner Laidlaw. While both scientists display highly problematic behavior irrespective of their gender, Laidlaw ultimately has a significant advantage over Frankenthaler when she becomes a mother – only then does she question her actions, especially regarding the product of their scientific experiment, her son Adam. As demonstrated in this thesis, Laidlaw shifts from being a self-centered scientist – a typical representative of Djerassi's science tribe – to a parent whose interest is not exclusively her success in the scientific community.

The novel *NO*, the final novel of Djerassi's Science-in-Fiction tetralogy, highlights the intersections of gender and race by exploring the reality of the Indian-American biologist Renu Krishnan. She not only faces discrimination as a woman in science but, in fact, as a female Person of Color in science. Even more, she has to navigate the markedly different cultures and cultural expectations of India and the USA – challenges that other *white* female scientists do not face. Yet, these very disadvantages become a useful resource to Krishnan – her heightened sensitivity of cultural differences enables her to successfully navigate the complex culture of the sciences. As an alternative model to the male-dominated culture – and as a strategy to endure within it – Krishnan and other female scientists in the novel cultivate bonds of female solidarity that function as gender-specific support systems. Yet, as the novel points out, these bonds reach their limits if other aspects of discrimination, such as race, are not sufficiently considered. This way, the novel points towards the narrowness of white feminism and implicitly advocates for an intersectional understanding of women in science.

Finally, my analysis of *Phallacy* has demonstrated how Djerassi's last Science-in-Theater play links the Two Cultures dichotomy of 'science versus art' to the dichotomy 'masculine versus feminine'. The art historian Regina Leitner-Opfermann and her male counterpart, the chemist Rex Stolzfuss, share significant features in some areas, such as intense hubris, professional narcissism, and an unhealthy level of obsession with their research – however, they display gender-specific differences in their behaviors which the play implicitly links to their professional fields. In their scientific dispute, Stolzfuss repeatedly resorts to drastic – and unprofessional – measures to win his very personal battle between the cultures with Leitner-Opfermann. Stolzfuss is presented as a typical (male) representative of Djerassi's science tribe, whose desire to defend his 'alpha male' position as scientist becomes more important than the scientific profession. Masked as scientific concerns, Stolzfuss reveals his misogynist attitudes towards Leitner-Opfermann and her allegedly inferior area of research. Embedded in an at times absurdly comical plot, the play points towards the potential of the Two Cultures of producing fruitful discourse – if both demonstrate a willingness to open-mindedness and communication.

Djerassi presents a rather static concept of culture, emphasizing a clear boundary between world of science and the 'outside', non-scientific world. With his understanding of the sciences as a culture, Djerassi aligns with C. P. Snow who famously argued for the existence of two opposing poles in society – the natural sciences *versus* the humanities. However, Djerassi does more than simply reproducing Snow's notion of the Two Cultures – with his literary works, Djerassi challenges the binary opposition of the 'science vs. humanities' debate, contributing to a productive interdisciplinary discourse. Most significantly, as my thesis has shown, he inextricably links the Two Cultures dichotomy to gender – an aspect notably absent in Snow's account. Later in this final chapter, I will examine how Djerassi's texts are particularly suitable for a gender-specific science education, for instance, in secondary school.

As chapter 4 of my analysis has shown, Djerassi highlights gender-specific issues which reflect both past and present realities of women science. Historically, particularly in the 18th and 19th centuries, women have been actively ignored in the sciences due to their gender. Based on the biologically deterministic assumption of the allegedly emotional female nature – standing in sharp contrast to an allegedly male rationality – men alone were considered exclusively eligible to do science. As a culture, science has thus been fundamentally shaped by men for men. This notion is represented by the image of scientists by students, as the extensive 'Draw me a

Scientist' studies have shown – to most, a scientist is male, older, and what I term 'unworldly', as he loses himself fully in his research.

By connecting these issues to Djerassi's literary venture, my thesis has demonstrated the critical potential of Djerassi's novels and plays to positively impact the real-life experiences of women in science. As outlined in my analysis, the feminist potential of the selected literary works lies in Djerassi's *allyship* – based on the theory of male feminist allyship by Ben Almassi, I consider Djerassi to be an important ally to the feminist quest for gender equality in the sciences. His works present a close examination of the binary of the dominant and the oppressed – potentially at his own cost, as he exposes pitfalls about a culture its members – his peers – are reluctant to acknowledge. Most importantly, his literary works amplify marginalized voices – *ergo*, female voices – in science.

Given his prestige in the science world, Djerassi's works were and still are able to reach his powerful peers in the sciences. Disguised as entertaining literature about scientists and the world of science, Djerassi's literature urges its readership to reflect upon gender inequality in science – an aspect to which Djerassi's male peers either are not exposed or which they actively ignore. Djerassi's *modus operandi* of 'smuggling' extends beyond science education: he also 'smuggles' feminist discourse into the minds of powerful men in science – or, to emulate his own wording, the 'gender-specific illiterate'. Admittedly, this argument places strong emphasis on authorial intent, which can be controversial. Nevertheless, given Djerassi's personal background as an 'insider' of the science tribe, both the content of his novels and plays as well as their reception are inextricably tied to him as a person and to his insider knowledge. In other words, the fairly unique situation of an established scientist turning to fiction inevitably impacts the reception of his literature.

Yet, despite placing Djerassi's literary works within the history of women in science and the framework of male feminist allyship theory, one question remains: How relevant are Djerassi's literary works – all written between the late 1980s and the 2000s – in their contemporary political context?

The relevance of Djerassi's works in the midst of a patriarchal backlash

In the course of writing this thesis, I have at times doubted whether a discussion of women in science is still significant (enough). Has not the feminist movement of the past decades rendered my discussion outdated? Have we not more or less overcome

the notion that women and men have different designated roles in society based on their gender? Cannot women in western countries autonomously choose their profession and be just as successful as their male peers? Especially in the aftermath of the #MeToo movement and the mainstreaming of feminist discourse among so-called 'millennials' (individuals born between 1981 and 1996) and 'GenZ' (individuals born between 1997 and 2012) through popular culture and social media, it might appear obsolete to advocate for an increased representation of women in science.

Yet, as I am finalizing this thesis in the first half of 2025, the political situation in western societies has become increasingly more complicated, reflecting a major patriarchal backlash. The current political climate is marked by uncertainty and an increasing polarization caused by global challenges, such as, *inter alia*, climate change, the wars in Ukraine and the Gaza strip, as well as the lingering effects of the COVID-19 pandemic. In many western countries, democratic norms have been under attack due to a rise of nationalism and populism. Even the USA, historically a beacon of democracy to the western world, currently undergo a significant democratic decline under president Donald J. Trump. In this context, the achievements of the fight for gender equality in the USA are seriously at stake. Trump and his political supporters foster a return to patriarchal norms, both regarding their own behaviors on the political stage as well as regarding their political agenda.

Already in the first Trump presidency, the members of his administration have frequently demonstrated programmatically masculine patterns of behavior – this applies to both males and females. Examples for these performances of manhood are an aggressive and domineering leadership style, the emphasis of archetypical masculine traits, such as physical strength and dominance, and the objectification of women through performances of sexualized masculinity. Trump and his supporters frame their political opponents as 'leftist' and 'woke' who aim at emasculating men and destroying (traditional) masculinity. In 2022, the increasingly more conservative U.S. Supreme Court has reached the historical verdict to overturn *Roe v. Wade*, enabling conservative lawmakers to restrict reproductive rights and limit women's bodily autonomy. In an attempt to reassert traditional gender roles and limit nonconforming identities, the Trump administration has restricted LGBTQ+ rights, for instance by banning transgender healthcare as well as education about transgender identity. Generally, Trump and his affiliates frame feminism and LGBTQ+ rights as threats to 'traditional' American values and through this claim, counter democratic attempts to foster diversity and equality.

The rise of anti-feminism is not an exclusively American issue. Many countries around the globe are facing a rise of misogyny, more often than not as a result of a political shift to the (extreme) right. Germany, where this thesis is written, is one of numerous countries with a major increase of violence by men against women and girls. According to a report presented by the German Ministry of Interior, femicides in Germany now occur almost every day (cf. Bundesministerium des Innern und für Heimat 2024). UN Women defines a femicide as "an intentional killing [of a female] with a gender-related motivation" (UN Women 2024), usually committed by an intimate partner or a male family member. Ironically, the press release by the Ministry of Interior fails to include the terms 'man' or 'men', proving how the general public continues to draw the attention away from men as the main perpetrators of violence against females.

Instead, the German Ministry of Interior implemented a new category into their official criminal statistics in 2022: felonies motivated by 'hatred of men' (*Männerhass*). According to the statistics, there were a total of 14 of such felonies in 2022, including feminist graffiti, such as "FEMINISM IS FOR EVRYONE" [sic] and "PATRIARCHAT ZERSCHAGEN" [sic], which roughly translates to "smash the patriarchy" (Amjahid 2023). The new category in the German criminal statistics was criticized for being a "pseudo-category under the guise of neutrality" (ibid., translation DSS). Even though this is only an anecdote, it shows where the political priorities lie – while men as offenders of violence are merely addressed, feminist graffiti are considered hate crimes.

Evidently, despite the impact of feminist movements over the past century, patriarchy has never been overcome – quite the contrary, we can clearly observe a return to traditional norms and values supporting hegemonic masculinity. The purpose of this thesis is not to explore these issues in greater detail – nonetheless, it becomes clear how the impact of this patriarchal backlash is still unforeseeable. Given the feminist focus of this thesis – and the feminist content of Djerassi's literary works – the recent patriarchal backlash plays a role in situating this thesis in its contemporary context.

Despite a significant increase of female participation and impact in the natural sciences in the past decades, this positive development is certainly not irreversible – and the percentage of female scientists should not be overestimated. As Clara Piloto, Director of Global Programs from MIT points out, the gender gap in STEM is "still gaping in 2023", as women make up only roughly a quarter of the STEM workforce in the US (Piloto 2023). A return to patriarchal values in society most likely will have an

impact on the role of gender in the culture of the natural sciences as well. The fight for gender equality continues and must be constantly defended and supported. This is where Djerassi's literary works come into play – as my thesis has shown, Djerassi's fictional demonstration of how gender discourse affects the sciences can impact the minds of his peers, the 'powerful men' in the sciences. This then has the potential to further the discussion of gender in the sciences and keeps the issue of gender on the map. By revealing repetitive manhood acts as the basis for the culture of the natural sciences, Djerassi's literary works are more relevant than ever.

As recent research shows, the current patriarchal backlash causes a further polarization between the (allegedly binary) genders. The emerging gender divergence is evident especially among younger generations, with (young) women becoming increasingly politically aware, while (young) men tend to lean towards unquestioned conservative values[27]. Drawing on Snow's Two Cultures dichotomy as a cultural metaphor, the (allegedly) binary opposition of the two genders can be similarly characterized by a "gulf of mutual incomprehension, […] and most of all lack of understanding" (Snow 2013, 4). Continuing this metaphor, the gulf of incomprehension between the genders needs to be bridged by the help of education to potentially create new, productive discourse.

Connecting this to my discussion, the general gender divide in society of course also affects the natural sciences. Yet, as Londa Schiebinger highlights, the issue of gender in science has provided the opportunity of successful collaboration, "where humanists and scientists have worked productively across C. P. Snow's two cultures" (Schiebinger 1999, 185). In order to foster gender-equality in science through education, Schiebinger argues for a "healthy working relationship between scholars involved in gender critiques of science and those doing science" (Schiebinger 1999, 185). What could gender-specific science education look like? Schiebinger advocates a gender-specific education for students of science, such as "courses on the history of gender in science" (ibid.), which some institutions have implemented in their curricula – unsurprisingly, one of these includes Stanford University, the home institution of both Carl Djerassi and Londa Schiebinger. This way, science students not only acquire an understanding of the history of women in science, it might also lead to "new vistas for future research" (Schiebinger 1999, 186).

[27] cf. Burn-Murdoch, John. 2024. "A new global gender divide is emerging." *Financial Times*. 26 January 2024. <https://www.ft.com/content/29fd9b5c-2f35-41bf-9d4c-994db4e12998> Last access 20 April 2025.

In his role as professor of chemistry at Stanford University, Djerassi discussed his literary works, particularly his plays, with his science students and thereby created a new realm of dialog between the Two Cultures. Despite being a theater enthusiast, he advocated his plays to be also understood as *Lesedramen*, in English referred to as 'closet dramas', providing the opportunity to be read, rather than performed. At the same time, he saw the potential of his plays to be implemented in, for instance, biology classes. As he suggests, his play *An Immaculate Misconception* "could well serve as a text book in which some key issues in contemporary reproductive biology could be played out by the students in some biology classes" (TMP 267). The combination of literature and science is worthwhile, not only in higher education. As a teacher in secondary education, I consider teaching Djerassi's literary works to be particularly worthwhile for students between the ages of 14 and 18 as it enables an interdisciplinary approach to relevant social issues, interactive teaching methods, and real-life applications.

When the Two Cultures meet in the Djerassi classroom: Drama and science education

In the past decades, educational research has revealed the many advantages of integrating the (supposedly) opposite poles of science and the humanities in secondary education. Oftentimes as an effort to counter a decreased interest of students in science and a scientific career, some educators have turned to drama to teach science – and to spark interest in the next generation of scientists[28]. Incorporating drama in science education can come in different forms – researchers and educators have developed a multitude of hands-on teaching methods[29]. These can include, *inter alia*, miming scientific key terms, acting out complex scientific phenomena, or performing role plays based on, for instance, a significant aspect of a scientist's life. Even though the idea of bringing together drama and science in education is certainly not new, teaching science through drama is still very much the exception to the rule.

Experts view the division of the Two Cultures as a main reason for the general hesitation towards the approach of using drama in science education. Education researchers J. Raphael, P.J. White, and K. van Cuylenburg argue against an understanding of the sciences and the humanities as dichotomous as "this division is

[28] An example for this is: Gebhard, Ulrich et al. 2019. *Natur – Wissenschaft – Theater. Performatives Arbeiten im Fachunterricht.* Weinheim: Beltz.
[29] For further reading, see e.g.: Abrahams, I. & Braund, M. 2012. *Teaching Chemistry, Physics, and Biology through Drama.* London: A&C Black.

unhelpful for solving the problems of the world" (Raphael et al. 2021, 5). Separating the disciplines does not mirror our complex 21st century realities since "a siloed approach does not reflect […] the spectrum of thinking required to solve problems in our rapidly changing environment" (ibid). Nonetheless, the reality at schools – in Australia, where Raphael et al. conduct their research, and certainly also in Germany, where this thesis is written – is that the school curricula constantly reproduce a division of the Two Cultures:

> Key learning areas like the arts and the sciences are further divided into subjects. […] In most secondary schools it is uncommon for learning areas to co-join. The disciplines are sometimes in competition for time and resources particularly within what is often referred to as the crowded curriculum. (Raphael et al. 2021, 5)

Yet, incorporating the Two Cultures in the 21st century classroom prepares students to tackle current challenges in society as it is more important than ever to foster interdisciplinary discourse. In an increasingly more complex world facing political challenges due to increased monological tendencies and the rising significance of echo chambers, both in analog as well as in digital spaces, students require skills like tolerance, open-mindedness, and the ability to engage in productive discourse. For a modern approach to education, it is non-negotiable to teach students to communicate effectively with members of different groups and differing opinions.

In this context, as research suggests, drama proves to be a particularly useful teaching method due to its inherently multi-perspective nature:

> Since the dawn of humankind, the arts of drama and theatre have been ways in which people have made sense of their world. Through drama and theatre humans have played out complex stories that involve understanding a wide range of perspectives, and that consider what it means to live ethically in the world. (Raphael & White 2021, 146)

Despite these advantages, science teachers display a reluctance towards addressing socio-scientific issues in their classrooms, as mentioned above (cf. Raphael & White 2021, 148). A reason for this could be due to the nature of science education. Debra McGregor, professor in education, suggests that teaching and learning in science follows a less collaborative approach, compared to, for instance, drama: "Texts used to teach scientific or technological concepts are often presented in an authoritarian style to learners that is impersonal and abstract. As such, science is portrayed as a set of objective truths and absolute realities" (McGregor 2021, 227). This claim is coherent with Djerassi's characterization of scientific writing as *monological* in nature – and formed the basis for his initial motivation to author literary works. To teach scientific

issues "in a more meaningful, relevant and accessible way" (McGregor 2021, 228), many scholars in education consider drama to be a beneficial teaching method.

Drama as a teaching method goes beyond being a vehicle for conveying information – the genre itself provides the opportunity to approach issues in a unique way. Drama in the science classroom allows for an investigation of crucial issues relevant to science, including

> the focus on identity (role-playing scientists' thinking and persona), on decision making, on recognising the role of scientific knowledge in relation to other knowledge forms, societal implications and ethical positions, on citizenship competencies, and on scientific dispositions that include engagement with the epistemic bases of the discipline. Drama affords multiple opportunities to anchor, concretise and review what otherwise would remain abstracted and remote. (Tytler & Prain 2021, 270)

Connecting science and drama sheds light on, for instance, ethical issues arising from scientific discoveries and creates a new realm of dialog. Due to its innate multiperspectivity, drama accounts for a level of immediacy which a regular science classroom setting might not offer. As Raphael et al. point out, the "pro-social nature of drama where diverse perspectives can contribute to the process of scientific inquiry or problem-solving is a student-centered and social-constructivist approach to learning in science" (Raphael et al. 2021, 16). Particularly "the dialogic nature of drama, and the formation of a discourse community" enable students to "establish shared meanings" (ibid.). Even more, drama

> can put the human into scientific learning, and through taking on a variety of roles, students see the world through the eyes of another and come to understand and appreciate diverse perspectives. The aesthetics of the art of drama can allow for affective learning, a moment of profound realisation or a 'shock to thought' […] which may lead to insight into the other, and empathy. This ability to develop empathy through the taking on of roles, including humans in diverse situations and non-human, is one of the unique affordances and the power of drama. It is of particular importance in understanding the complex ethical and social justice impacts of science on humans. (Raphael et al. 2021, 16)

Especially regarding the issue of gender in science, drama proves to be a particularly worthwhile approach to teaching: Recent research in science education "indicates that drama pedagogy is an effective method by which to explore issues of gender politics in schools and in the wider community" (Sallis & Bird 2021, 244). The connecting element here is the aspect of performativity – both in gender as well as in drama. As Jo Riley points out in her 2022 monograph *Teaching Drama with, without and about Gender*, "Judith Butler coined the term 'performativity' to encompass the sense of 'trying out' or 'trying on' gender identities in daily life" (Riley 2022, 4). Similar to

"trying out" gender identities, the realm of drama offers "a space where 'trying out' is a central mission" (ibid.). In this sense, performativity refers to "the essence of identity formation – a sense of 'doing', rather than 'being'. One's (gender) identity is expressed in action, regardless of what one seems 'to be'" (ibid.).

In the context of secondary school education, incorporating drama in gender-specific science education has proven to be particularly suitable for educating boys. In his 2011 article "The Drama Boys: Drama Pedagogy and the Education of Boys in a Coeducational Government School", Richard Sallis refers to a study conducted in the early 2000s at a coeducational secondary school in Melbourne, Australia which revealed that "the physical and interpersonal teaching and learning environment of the drama classroom, along with particular pedagogical strategies employed by the teachers, enhanced the participation of the male students in the subject" (Sallis 2011, 47). Like Riley, Sallis draws a connection to Butler's theory of performativity as it is

> through the repetition of stylised acts in time that gender identity is constructed. At this school it was evident that in the drama classes the male students were encouraged to query and contest performative expressions which perpetuated the hegemonic masculinities displayed by some of the boys in the wider school community and within the class. (Sallis 2011, 51)

Given the pedagogical potential of drama in science education – and in light of this thesis's focus on gender – how can teaching Djerassi's dramatic texts in secondary schools foster an understanding of gender-specific issues in science? In general, drama gives students the opportunity to experience issues central to the human condition – by performing gender-specific issues, the performativity of gender is not only emphasized, it is *embodied* and this way, particularly perceptible to the students. In other words, acting out the 'manhood acts' of characters like Lavoisier or Frankenthaler, for instance, probably has a more resonating effect on students than reading a factual text about gender-specific behavior of male scientists. Certainly, *performing* gender in the drama classroom raises the learners' awareness of gender-specific issues in a way that texts cannot.

The research presented above demonstrates how teaching science through drama offers the unique opportunity to not only bridge the Two Cultures but in fact, to create a new realm of productive discourse about critical issues in the culture of the sciences. In this way, Djerassi's literary works contribute to a modern approach to education fostering interdisciplinarity and collaboration. Similar to his crossing of boundaries between literary genres – and of course, the Two Cultures – I intend to cross another boundary by teaching selected literary works in an interdisciplinary

class on science, literature, and gender. In the appendix of this thesis, I am presenting a draft for a Science-in-Literature class for year 12 students at a German *Gymnasium*.

Going beyond the Science-in-Literature works presented

As women still represent only about 30% of scientists worldwide, a lot of attention has been brought to the study of women in science – particularly how they can adapt to the world of science in order to succeed in it. Yet, little has been done to uncover and deconstruct the gendered structure of science – a system established by *male* scientists and designed to serve their needs. In other words, instead of asking "What can women do to prevail in the sciences?", very few have asked "How can men in science be more inclusive?". Like the opening quote of this final chapter by Londa Schiebinger suggests, including women in science is non-negotiable because the sciences are a *human* – and not masculine – endeavor. While female solidarity – such as the bonds portrayed in Djerassi's novel *NO* – can be a powerful force of change, I consider the concept of male feminist allyship to hold even greater transformative potential. By engaging the privileged group of male scientists, male feminist allyship creates opportunities to reveal the deeply ingrained, gender-specific norms in the sciences and, in doing so, foster *fundamental* change. German sociologist Gregor Fabian picks up on this notion – he claims that it is the responsibility of male scientists to take action to fight the discrimination against women in science (cf. Freier 2025).

Admittedly, the repeated use of the male/female and masculine/feminine binaries may appear outdated to some. His literary works, written primarily between the late 1980s and the early 2000s, clearly mirror the gender norms of their time, often reinforcing binary oppositions: male vs. female, masculine vs. feminine and – implicitly gendered – science vs. humanities. While these binaries continue to represent past and present realities, a more contemporary approach calls for challenging the gender binary, moving towards more nuanced notions of gender. Djerassi takes steps in this direction with his play *Taboos*. Published together with the play *ICSI* under the title *Sex in an Age of Technological Reproduction* (2008), the play explores gender-specific boundaries regarding family, romantic relationships, and parenthood in the context of complex ethical issues revolving reproductive technology. I have not included this work in my thesis as it does not focus on the behaviors of scientists – instead, it demonstrates how individuals can be affected by scientific discoveries.

In this play, the lesbian couple Harriet and Sally want to have a child – with one of them as the child's biological mother – with the help of ICSI. Embedded in dialog, *Taboos* presents multiple perspectives on the couples' journey towards parenthood, where progressive ideas of family clash with traditionally Christian notions. Consistent with Djerassi's oeuvre, the play provokes discussion rather than providing answers, thereby stressing the multiperspectivity of the issues it explores. Regarding gender, *Taboos* challenges heteronormative notions of parenthood and essentialist ideas of gender regarding reproduction, for instance the role of egg donors and surrogacy. The allegedly private issue of reproduction becomes political, sparking debate about who has control over reproduction and whose desires are validated or stigmatized. Given this gender-specific potential, I have included *Taboos* in my aforementioned project course, as the issues it presents are on par with curricular requirements. Moreover, on a meta level, I consider *Taboos* particularly valuable for students because it engages with complex, ethical issues regarding science. The play encourages navigating conflicting viewpoints while sustaining constructive dialog – a skill that is increasingly important in the current political climate.

Given Djerassi's extensive engagement with feminist issues, it is striking that he refers to the feminist agenda of his literary works only in seemingly passing mentions. This is particularly curious considering that, in his numerous non-fictional texts, he is certainly not known for being vague or beating around the bush regarding his authorial intentions. All of the selected works I have included in my thesis begin with an elaborate fore- or afterword on the overarching themes in the respective work. Most prominently, Djerassi draws attention to his understanding of the sciences as a tribal culture – in the foreword to *Stammesgeheimnisse* (2002), Djerassi proudly admits to being an autobiographer, masked as an author of fiction (cf. Djerassi 2002, 7). Remarks on the feminist quality of his literature can only be found in the foreword to *NO*, in which he expresses his interest in the challenges faced by female scientists from India. Is this the case because he was not fully aware of the significance of the gender-critical potential of his works? Did he himself consider these aspects as secondary? Or is this in fact an exercise of real 'smuggling', this time much more subtle than his 'smuggling' of scientific knowledge? Given the current political climate, marked by increasingly antifeminist notions, the decision to not overemphasize the feminist potential of a text and instead 'smuggle' it into the minds of (powerful) men can be seen as a strategic move.

That said, my thesis is neither a manifesto for the 'usefulness' of Djerassi's literary works nor a manual for how to 'do science' in a gender-conscious way. His

texts should not be reduced to their usability – especially since, as I have pointed out, they are not without flaws regarding the representation of stereotypical gender roles. Instead, my thesis provides a detailed analysis of some of the very few fictional works dealing with (actual) science *and* gender. The richness of Djerassi's oeuvre lies in its many layers: embedded in intriguing plotlines, we are confronted with real – or potentially real – scientific phenomena *and* with the struggle of women in science. Of course, the strategies developed by Djerassi's very resilient female scientists cannot and should not be perceived as operative instructions for women in science. Instead, they expand the awareness of gender bias in fictional *Lebenswelten*, promoting reflection rather than instruction.

Appendix

The following section is written in German as the course I am presenting is specifically designed for the school system of North Rhine Westphalia, Germany.

Entwurf eines Projektkurses für die gymnasiale Oberstufe in Nordrhein-Westfalen

Titel des Projektkurses:
„Science-in-Literature: The Culture of the Natural Sciences in Carl Djerassi's Literary Works"

Einführung

(The) polarization [of art and science] is sheer loss to us all. To us as people, and to our society. It is at the same time practical and intellectual and creative loss, and I repeat that it is false to imagine that those three considerations are clearly separable.

- C. P. Snow (1959, 6)

In der Arbeit an meiner Dissertation zu genderspezifischen Konstrukten in Carl Djerassis literarischen Werken drängten sich mir als Gymnasiallehrkraft für das Fach Englisch die Texte Djerassis immer wieder als möglicher Gegenstand für den gymnasialen Unterricht richtiggehend auf. Ausgehend von Djerassis selbstdefinierter didaktischer Mission, durch Literatur Wissen über naturwissenschaftliche Phänomene zu vermitteln – und meiner These, dass er diese pädagogische Dimension mit der Frage nach der Bedeutung von Gender in den Naturwissenschaften verbindet – liegt eine Vermittlung von Djerassis Werken im gymnasialen Unterricht nahe. Im Folgenden präsentiere ich den Entwurf eines Projektkurses für die Sekundarstufe II,

dem ich den Titel „Science-in-Literature: The Culture of the Natural Sciences in Carl Djerassi's Literary Works" gegeben habe.

Hintergrund

Das Ministerium für Schule und Bildung des Landes Nordrhein-Westfalen (im Folgenden MSB NRW abgekürzt) unter der Leitung von Ministerin Dorothee Feller hat 2024 eine umfassende Reform der gymnasialen Oberstufe für die Abiturjahrgänge ab 2029 vorgestellt. Diese sieht neben der Implementation eines fünften Abiturfachs auch die Stärkung von Projektkursen vor (vgl. MSB NRW „Schulfachliches Eckpunktepapier"). Zielsetzung dieses neuen Abiturformats ist, so Bildungsministerium, die gymnasiale Oberstufe in NRW „zukunftsfest" zu machen (ebd.). Aufgrund „veränderte[r] gesellschaftliche[r] Anforderungen" zielt die geplante Weiterentwicklung der gymnasialen Oberstufe auf eine „vertiefte Allgemeinbildung" (ebd.) sowie auf die Förderung „zukunftsrelevante[r] Kompetenzen für Studium, Beruf und Lebenswelt" ab (ebd.).

Wie im Schulfachlichen Eckpunktepapier des MSB NRW betont, soll durch die Oberstufenreform „das Element der Wissenschaftspropädeutik […] in den Fokus rücken" (ebd.). Wenngleich wissenschaftspropädeutisches Arbeiten bereits jetzt fest in der „Verordnung über den Bildungsgang und die Abiturprüfung in der gymnasialen Oberstufe" (APO-GOSt) verankert ist, soll dieser Aspekt der Schulbildung in der gymnasialen Oberstufe durch die Reform noch weiter ausgeschärft werden. Das neue fünfte Abiturfach soll in Form einer Präsentationsprüfung geprüft werden, zudem sieht die Reform verpflichtende Projektkurse für die Qualifikationsphase 2 vor. Bisher sind Projektkurse zwar optionaler, aber nicht obligatorischer Bestandteil des Kursangebots der gymnasialen Oberstufe in NRW. Aufgrund ihrer Schwerpunktsetzung auf „selbstständiges, strukturiertes und kooperatives Arbeiten" (MSB NRW, „Häufig gestellte Fragen") bietet das Format des Projektkurses die Möglichkeit, wissenschaftspropädeutische Kompetenzen gezielt zu fördern.

Schulrechtliche Vorgaben für einen Projektkurs in der gymnasialen Oberstufe

Bis dato muss ein Projektkurs laut APO-GOSt mindestens zwei Wochenstunden – nach Schulkonferenzbeschluss auch drei Wochenstunden – über den Umfang von zwei Schulhalbjahren umfassen (vgl. APO-GOSt §11 Abs. 8). Die neue

Oberstufenreform des Bildungsministeriums NRW sieht vor, dass Projektkurse in der Qualifikationsphase 2 über zwei Schulhalbjahre wöchentlich mit drei Stunden unterrichtet werden – der unten aufgeführte, exemplarische Verlaufsplan entspricht diesen formalen Vorgaben. Dabei kann (maximal) ein Drittel der Kurszeit als flexible Lernzeit, *ergo* in eigenverantwortlichem Arbeiten, erfolgen. Diese umfassende Zeit des selbstständigen Lernens der Schülerinnen und Schüler ist als Lernsetting maßgebend für Projektkurse und grenzt diese vom herkömmlichen Kursformat der gymnasialen Oberstufe ab.

Inhaltlich muss ein Projektkurs immer mindestens einem Referenzfach zugeordnet sein (vgl. APO-GOSt §11 Abs. 8) – die unterrichtende Lehrkraft muss über die Lehrbefähigung von mindestens einem dieser Referenzfächer verfügen. Als Voraussetzung zum Belegen des hier vorgestellten Projektkurses gilt, dass das Referenzfach Englisch zuvor durchgehend belegt worden sein muss. Außerdem müssen die Schüler*innen „über angemessene fachliche Grundkenntnisse verfügen, die im Regelunterricht der gymnasialen Oberstufe erworben werden" (MSB NRW, „Häufig gestellte Fragen"). Als Bewertungsgrundlage für die Projektkurse der reformierten gymnasialen Oberstufe dienen neben einem Teilprodukt pro Halbjahr die Sonstige Mitarbeit, welche „alle im Zusammenhang mit dem Unterricht erbrachten, schriftlichen, mündlichen und praktischen Leistungen […] sowie der Dokumentation im Projektkurs" umfasst (APO-GOSt §15 Abs. 1)[30]. Verpflichtend ist zudem die Erstellung eines Großprodukts, welches über den Zeitraum beider Halbjahre anzufertigen ist und zum Ende des zweiten Halbjahres vorgestellt wird. Die Großprodukte des hier vorgestellten Projektkurses können kreativer Natur sein (z.B. Inszenierung eines dramatischen Textes Djerassis, Umschreiben eines Textes Djerassis, Verfassen eines eigenen literarischen Textes) oder auch einen naturwissenschaftlichen, historischen oder soziologischen Fokus haben. Die Themenfindung obliegt hier den Lernenden und wird durch die Lehrkraft beratend begleitet.

Zudem müssen alle Schülerinnen und Schüler eine Präsentationsprüfung pro Halbjahr zu einem selbst gewählten, kursrelevanten Thema ablegen – hiermit wird das Prüfungsformat für das neue fünfte Abiturfach eingeübt. Begleitend zum Projektkurs wird außerdem ein Portfolio erstellt, welches die Lernergebnisse und Lernprozesse dokumentiert und, gemäß APO-GOSt, in die Bewertung mit einfließt (vgl. APO-GOSt

[30] Bisher sollte für Projektkurse in der gymnasialen Oberstufe lediglich eine Jahresnote für beide Halbjahr erteilt werden (vgl. APO-GOSt §14 Abs. 7). Die neuen Projektkurse sehen nun die Erteilung einer einzubringenden Note pro Halbjahr vor.

§14 Abs. 7). In ihren individuellen Portfolios sammeln die Lernenden, unter anderem eigene Aufzeichnungen, Planungsschritte, Reflexionen zu Planung und Durchführung sowie abschließende (Selbst-)Evaluationen. Hierdurch wird den Schülerinnen und Schülern ein eigenverantwortlicher, selbstbestimmter Lernprozess im Rahmen wissenschaftspropädeutischen Arbeitens ermöglicht.

Ausgehend von diesen Formalia für die Entwicklung eines Projektkurses stellt sich nun die Frage, inwiefern eine Auseinandersetzung mit Carl Djerassis Werken für dieses Kursformat sinnvoll gestaltet werden kann. Ich bin überzeugt, dass sich Djerassis Literatur besonders gut für den eigenständigen Lernprozess eines Projektkurses eignet. Auch Museumspädagogin Traudel Weber betont die besondere Eignung von Djerassis Werken – insbesondere des Stücks *Oxygen* – für den Einsatz in Projektkursen. Sie begründet dies vor allem mit der Interdisziplinarität von Djerassis Literatur (vgl. Weber 2001, 135). Im Folgenden präsentiere ich zunächst eine kurze Analyse des Oeuvre Djerassis, um in einem zweiten Schritt die Eignung für den Projektunterricht der gymnasialen Oberstufe mit Bezug auf curriculare Vorgaben zu erläutern.

Was ist ‚Science-in-Literature'? Über die Bedeutung Djerassis literarischer Werke

Als Schriftsteller definierte Carl Djerassi (1923-2015) für sein Werk ein konkretes Ziel: Der weltberühmte Naturwissenschaftler wollte spezifisches, naturwissenschaftliches Wissen – in der Form unterhaltender Literatur – in die Köpfe derer „schmuggeln", die den Naturwissenschaften abgeneigt – oder natur-wissenschaftlich vermeintlich ungebildet – sind (vgl. Djerassi 2005). Mehr noch, mit seinen literarischen Werken zielt er auf eine literarische Darstellung der Kultur der Naturwissenschaften ab, welches die der Allgemeinheit vermeintlich verborgenen, kulturellen Normen der Naturwissenschaften offenbart. Djerassi, der sich selbst als die „Mutter der Pille" bezeichnete, erlangte weltweite Bekanntheit als Chemiker für die Synthese des Sexualhormons Norethisteron und ebnete damit den Weg für die sogenannte „Antibabypille". Für seine literarischen Werke erfand er den generischen Terminus ‚Science-in-Fiction' bzw. ‚Science-in-Theatre', um sie von Science-Fiction abzugrenzen[31] – er betont damit im Unterschied zu letzterer die Richtigkeit bzw. Plausibilität der von ihm thematisierten naturwissenschaftlichen Phänomene (vgl.

[31] Um beide literarischen Genres zusammenzufassen und gleichsam auf seine Romane und Dramen zu verweisen, nutze ich den Begriff ‚Science-in-Literature'.

Djerassi 2005). Als Autor von Romanen und Dramen (sowie, zu einem kleineren Teil, Kurzgeschichten und Lyrik) argumentiert er, dass die Naturwissenschaften und Naturwissenschaftler*innen (bewusst oder unbewusst) Teil einer spezifischen Stammeskultur sind. Typisch für die Wissenschaftler*innen in seinen Werken ist ein auffälliger Konkurrenzkampf sowie das Streben nach Priorität und Anerkennung. Durch seine literarisch-anthropologische Sichtweise auf die Wissenschaftskultur als Konstrukt hinterfragt Djerassi den eindimensionalen Objektivitätsanspruch und häufig unreflektierten Wahrheitsanspruch der Naturwissenschaften.

Eine bedeutsame, nach den Ergebnissen meiner Dissertation sogar die *zentrale* Eigenschaft der Stammeskultur der Naturwissenschaften, ist ihre Strukturierung nach Genderkriterien. Wie ich in meiner Dissertation gezeigt habe, wird die Wissenschaftskultur in Djerassis literarischen Werken (oftmals unsichtbar) von genderspezifischen Vorurteilen beeinflusst und strukturiert – weshalb die literarische Konstruktion der Naturwissenschaften (und damit meine literatur-/kulturwissenschaftliche Analyse) hilfreich für ein Verständnis von deren Normen und Standards ist. So kann beispielsweise das von Djerassi oftmals thematisierte extreme Konkurrenzverhalten in den Naturwissenschaften als männliches Verhalten verstanden werden. Die historische Unterrepräsentanz von Frauen in den Naturwissenschaften steht somit in Zusammenhang mit einer männlich dominierten Wissenschaftskultur, die als *hostile environment*, als ein für Frauen feindliches Territorium, verstanden wird.

Die für den Projektkurs vorgeschlagenen literarischen Werke bieten die Möglichkeit, anhand von fiktiven Romanfiguren kulturelle Wirklichkeiten in den Wissenschaften erfahrbar und begreiflich zu machen – hierbei spielt der Genderaspekt immer wieder eine bedeutsame Rolle. *Cantor's Dilemma* (1989), das Erstlingswerk seiner ‚Science-in-Fiction' Romantetralogie, ist als programmatisches Werk Djerassis zu verstehen: Die im Roman behandelten kulturellen Aspekte der Naturwissenschaften bilden die Grundlage für die darauffolgenden Werke, die diese aufgreifen und erweitern und dadurch eine umfassende Kritik der Naturwissenschaften, vor allem hinsichtlich der Signifikanz der Genderproblematik, birgt. So erleben wir die Naturwissenschaftler*innen – vor allem die Männer – als extrem ehrgeizig und egozentrisch, deren Streben nach Anerkennung und wissenschaftlichem Ruhm, vor allem ihre Jagd nach dem Nobelpreis, die Forschungspraxis sowie die Wissenschaftskultur maßgeblich bestimmen. Vor allem die genderspezifischen Diskrepanzen zweier Forschungsteams – dem männlichen Team Cantor/Stafford ist das weibliche Team Ardley/Price gegenübergestellt –

machen die Machtverhältnisse und Abhängigkeiten in der männlich dominierten Wissenschaftskultur deutlich. Wenngleich die weiblichen Wissenschaftlerinnen ihren männlichen Kollegen hinsichtlich Ehrgeiz und Streben keinesfalls nachstehen, wählen sie dennoch alternative Arbeitsweisen, die die Kollaboration mit anderen Wissenschaftler*innen gezielt fördern und dadurch teilweise sogar wissenschaftliche Netzwerke weiblicher Solidarität gebildet werden.

Nach seinem Romanzyklus wandte Djerassi sich zunehmend dem Drama zu. In seinen Theaterstücken thematisiert er neben den kulturellen Normen der Wissenschaften ethische Grenzen wissenschaftlicher Praxis. Im Kontext einer Auseinandersetzung mit der Bedeutung wissenschaftlicher Entdeckungen lenkt *Oxygen*, das er zusammen mit dem Nobelpreisträger Roald Hoffmann verfasste, unsere Aufmerksamkeit auf den Einfluss der Ehefrauen bekannter Naturwissenschaftler auf deren wissenschaftliche Arbeit, ja sogar deren konkreten wissenschaftlichen Anteil. In zwei parallelen Handlungssträngen in 1777 und 2001 erleben wir nicht nur, wie die Kultur der Naturwissenschaften im Kontext von Gender sich scheinbar kaum verändert hat – wir beobachten zudem, wie wenig sensibel die (männlichen) Naturwissenschaftler mit einer Vertreterin der Geisteswissenschaften umgehen. Hiermit verbindet Djerassi wirkungsvoll die Genderproblematik mit der Analyse der sogenannten ‚Zwei Kulturen', der berühmten These C. P. Snows hinsichtlich der vermeintlich tiefen Kluft zwischen den Natur- und Geisteswissenschaften. In seinem Stück *Taboos* (2008) rückt Djerassi reproduktive Technologien hinsichtlich ihrer (bio)ethischen und religiösen Fragestellungen in den Fokus: Das lesbische Paar Harriet und Sally möchte ihren Kinderwunsch mithilfe von ICSI (kurz für *intracytoplasmic sperm injection*), einer Form der künstlichen Befruchtung, realisieren. Den liberalen Wertevorstellungen des homosexuellen Paares entgegengesetzt steht das konservativ-christliche Ehepaar Priscilla und Cameron, das versucht, auf natürlichem Weg ein Kind zu bekommen, was bisher jedoch nicht gelingt. Das Stück thematisiert schonungslos gesellschaftliche Tabuthemen rund um Reproduktion, Religion, Gender und Sexualität, hinterfragt die Doppelmoral der Figuren und konfrontiert beide Seiten mit ihren Widersprüchen.

Djerassi selbst begreift seine Theaterstücke (auch) als Lesedramen und regt an, diese beispielsweise in Biologieseminaren zu lesen, um so die naturwissenschaftliche Komponente der universitären Bildung um eine ethische Auseinandersetzung mit wissenschaftlichen Phänomenen zu erweitern (vgl. Djerassi 2001, 267). Die Stärke der Dramen Djerassis liegen in der unmittelbaren Erfahrbarkeit der aufgeworfenen Probleme und gehen weit über eine Vermittlung naturwissenschaftlichen Wissens

hinaus. Diese Erfahrbarkeit beruht insbesondere auf der dialogisch-diskussionsorientierten Struktur der Texte – und seiner dadurch entstehenden Unmittelbarkeit.

In meiner Dissertation habe ich ausführlich dargestellt, dass sich das Genre aufgrund seiner performativen Qualität besonders für eine Auseinandersetzung mit genderspezifischen Themen eignet: Ausgehend von Judith Butlers Theorie der Performativität ist Gender immer eine *performance*, mit der die Geschlechtsidentität durch wiederholte Handlungen definiert wird. Wie ich in meiner Dissertation gezeigt habe, bietet ein interdisziplinärer Unterricht, der theaterpädagogische Elemente und Naturwissenschaften verknüpft, die Möglichkeit, genderspezifische Aspekte – wie zum Beispiel die wiederholten *manhood acts* (im Deutschen etwa „Handlungen der Männlichkeit") der Wissenschaftler*innen in den Werken Djerassis – multiperspektivisch zu ergründen. Eine konkrete Verankerung ins Curriculum der gymnasialen Oberstufe des Landes NRW stelle ich im folgenden Teil vor.

Einbettung des Projektkurses ‚Science-in-Literature' in das Curriculum der Gymnasialen Oberstufe

Der hier vorgestellte Projektkurs entspricht in vielfältiger Hinsicht den curricularen Vorgaben der gymnasialen Oberstufe – und erweitert diese in sinnvoller Art und Weise. Als Referenzfach dient das Fach Englisch, vor allem bedingt durch die intensive Auseinandersetzung mit einem englischsprachigen Roman(auszug), zwei englischsprachigen Theaterstücken sowie anderen Fachtexten in englischer Sprache. Die englischsprachigen Unterrichtsgegenstände sowie die daraus resultierende englischsprachige Kommunikation bereiten somit in besonderem Maße auf akademisches Arbeiten in der oftmals englischsprachigen Wissenschaftswelt vor. Teile des hier vorgestellten Projektkurses habe ich in der Vergangenheit in Proseminaren für Studierende im Grundstudium der Anglistik/Amerikanistik an der Fakultät Kulturwissenschaften der Technischen Universität Dortmund unterrichtet[32]. Hierdurch wird die besondere wissenschaftspropädeutische Bedeutung des Projektkurses deutlich. Aufgrund der naturwissenschaftlichen Inhalte der

[32] Die von mir unterrichteten Seminare, die sich vollumfänglich oder in Teilen mit den literarischen Werken Carl Djerassis beschäftigten, waren: Proseminar „Women-in-Science: Feminism in Carl Djerassi's Science-in-Literature" (Sommersemester 2017); Proseminar „Representations of Motherhood" (Wintersemester 2017/18 und Sommersemester 2020); Proseminar „Feminist Voices" (Sommersemester 2021).

ausgewählten literarischen Werke existieren klare Bezüge zu den Fächern Chemie, Biologie und Physik. Idealerweise wird der Projektkurs durch ein Team zweier Lehrkräfte, bestehend aus einer Englisch-Lehrkraft und einer Lehrkraft für eine Naturwissenschaft, unterrichtet.

Inhaltlich fördert der Projektkurs die Erweiterung zentraler Kompetenzen des Faches Englisch für die gymnasiale Oberstufe. Neben der Förderung der funktionalen kommunikativen Kompetenzen sowie der Text- und Medienkompetenzen zielt der Projektkurs auf die Förderung der Interkulturellen Kompetenz ab. „Interkulturelle Kompetenz" meint hier nicht nur den respektvollen und produktiven Umgang mit Unterschieden im ethnologischen Sinne – der Projektkurs bietet die Möglichkeit einer Auseinandersetzung mit einem erweiterten Kulturbegriff, der auf die Reflexion kultureller Normen, wie sie beispielsweise in den Naturwissenschaften beobachtbar ist, abzielt. Die Diskussion der literarischen Werke Djerassis regt die Lernenden an, vermeintlich unumstößliche Wahrheiten über die Naturwissenschaften und Naturwissenschaftler*innen, beispielsweise den Objektivitätsanspruch, zu hinterfragen und zu diskutieren. Hierbei ist zu betonen, dass dies keinesfalls die Förderung einer anti-naturwissenschaftlichen Haltung meint – es geht in keiner Weise darum, wissenschaftlich gesicherte Erkenntnisse in Frage zu stellen. Vielmehr sollen die Schülerinnen und Schüler die Möglichkeit haben, die Naturwissenschaften überhaupt als *Kultur* zu begreifen. Ein Verständnis der Naturwissenschaften als Kultur öffnet zudem Türen zu anderen kulturbedingten und -bedingenden Faktoren, wie zum Beispiel Gender. Dadurch werden die Schülerinnen und Schüler befähigt, die fehlende Repräsentation von Frauen in den Naturwissenschaften in den Kontext einer männlich dominierten Wissenschaftskultur zu setzen und zu reflektieren.

Die intensive Auseinandersetzung mit Gender als zentralem Aspekt der Wissenschaftskultur entspricht einem zeitgemäßen Oberstufenunterricht und knüpft an den Kernlehrplan (KLP) Englisch des Landes NRW an. So sollen laut KLP die Schülerinnen und Schüler zum Ende der Qualifikationsphase in der Lage sein, angemessen mit Texten umzugehen, die „gender- und diversitätssensibel" sind (KLP Englisch Sek. II 27) sowie u.a. „ethnische, kulturelle, soziale, sexuelle und geschlechtliche Vielfalt" abbilden (KLP Englisch Sek. II 26). Die Bedeutung der Gender- und Diversitätssensibilität für den schulischen Unterricht in NRW wird zudem hervorgehoben durch den Aktionsplan „Impulse 2020 – für queeres Leben in NRW" des Ministeriums für Kinder, Familien, Flüchtlinge und Integration des Landes NRW (MKFFI), welcher aktuelle Herausforderungen von Angehörigen der LGBTQ+ Community herausstellt. Hier wird die besondere Situation von Regenbogenfamilien

herausgestellt, *ergo* Familien mit mindestens einem Elternteil, der lesbisch, schwul, bisexuell, trans*, inter ist oder sich anderweitig dem LGBTQ+ Spektrum zugehörig fühlt. Das MKFFI sieht hier einen besonderen Bildungsauftrag der Schulen: Durch queersensible Bildung können Vorurteile abgebaut und ein „selbstbewusste[r] Umgang mit der eigenen sexuellen Orientierung und geschlechtlichen Identität" gefördert werden (MKFFI 2020, 21). Mehr noch, „[d]urch Information und die Vermittlung eines respektvollen Umgangs miteinander kann psychische und physische Gewalt verhindert werden" (ibid.).

Hier setzt eine Auseinandersetzung mit Carl Djerassis Drama *Taboos* an: Durch die Erfahrbarkeit der queeren Lebensrealitäten der Figuren Harriet und Sally wird neben der naturwissenschaftlichen Auseinandersetzung mit reproduktiver Technologie vor allem ihre gesellschaftliche und individuelle Bedeutung deutlich. Die dialogische Form des Dramas betont die persönliche Dimension der Regenbogenfamilien und ermöglicht in besonderer Weise den Perspektivwechsel. Die Einnahme anderer, möglicherweise fremder Perspektiven schafft Raum für die Bewusstwerdung eigener Haltungen und Werte sowie das Nachempfinden von Denk- und Verhaltensweisen anderer Menschen und fördert dadurch die Empathie und Diskursfähigkeit der Lernenden. Das MKFFI bezieht hier auch Unterrichtende explizit mit ein (vgl. MKFFI 2020, 21) – das Unterrichten queersensibler Literatur erfordert auch seitens der Lehrkräfte eine kritische Reflexion ihrer eigenen Haltungen.

Natürlich bieten die naturwissenschaftlichen Themen, die in den für den Projektkurs vorgesehenen literarischen Werken Carl Djerassis relevant sind, auch die Möglichkeit der Auseinandersetzung mit gesellschaftlichen und ethischen Fragestellungen bezüglich des kritischen Potenzials wissenschaftlicher Errungenschaften. Neben der Frage nach der Bedeutung bahnbrechender wissenschaftlicher Erkenntnisse in *Cantor's Dilemma* und *Oxygen* sowie einer Auseinandersetzung mit dem wissenschaftlichen Prozess selbst – insbesondere dem Wettbewerbsdruck in der Forschung sowie der Rolle von Wissenschaftler*innen als öffentliche Figuren – sollten im Rahmen der Beschäftigung mit dem Drama *Taboos* auch die gesellschaftlichen Auswirkungen reproduktiver Technologien thematisiert werden.

Das Unterrichten im Tandem mit einer Lehrkraft für eine Naturwissenschaft ermöglicht eine fachlich angemessene Erarbeitung der in den literarischen Werken thematisierten naturwissenschaftlichen Phänomene. Im Kontext von *Cantor's Dilemma* ist dies die Karzigonese, *ergo* die Umwandlung gesunder Zellen in Krebszellen, idealerweise unterrichtet von einer Biologielehrkraft. Bezüglich des Theaterstücks

Oxygen können die chemischen Eigenschaften von Sauerstoff erarbeitet werden. Anknüpfend an das Drama *Taboos* kann eine Thematisierung bzw. Wiederholung der biologischen Grundlagen der menschlichen Reproduktion sowie der Bedeutung technologischer Intervention erfolgen.

Die Verknüpfung der Unterrichtsfächer Englisch und Biologie bzw. Chemie böte neben des modernen curricularen Charakters fächerübergreifenden Unterrichts zudem die besondere Möglichkeit der Verknüpfung der sogenannten Zwei Kulturen, zurückgehend auf C.P. Snows richtungsweisende *Rede Lecture* des Jahres 1959, auf welche ich mich ausführlich in meiner vorangegangenen Dissertationsschrift ausführlich bezogen habe. Snow beklagt die Teilung der intellektuellen Kulturen der westlichen Welt in zwei diametrale Pole und, dadurch resultierend, eine vermeintlich unmögliche Kommunikation zwischen den Naturwissenschaften und den Geisteswissenschaften. Der dargestellte Projektkurs setzt sich kritisch mit dieser vermeintlichen Zweiteilung auseinander und fördert die Überbrückung der von Snow beklagten Kluft.

Der spezifische Fokus des Projektkurses auf die Rolle von Gender in den Naturwissenschaften füllt zudem eine inhaltliche Lücke in den Kernlehrplänen der Fächer Chemie, Biologie und Physik für die Sekundarstufe II des Landes NRW – diese sehen keine explizit gendersensible Bildung vor. Lediglich an zwei übereinstimmenden Stellen in den drei Kernlehrplänen dieser Fächer wird überhaupt auf Gender Bezug genommen: Zum einen geschieht dies im Kontext des allgemeinen Bildungs- und Erziehungsauftrags der Schule, der neben, unter anderem, „Menschenrechtsbildung“, „Werteerziehung“ und „Bildung für nachhaltige Entwicklung“ auch die „geschlechtersensible Bildung“ vorsieht (vgl. KLP Chemie Sek. II 8). Zum anderen enthalten alle drei Kernlehrpläne den nicht weiter erläuterten Hinweis, dass die „Heterogenität der Schülerinnen und Schüler in Bezug auf Interessen, kulturellen Hintergrund, Geschlechtersozialisation, Vorerfahrungen und fachspezifische Kenntnisse […] angemessen zu berücksichtigen“ sei (KLP Biologie Sek. II 11).

Auch eine Betrachtung der eigenen Disziplin auf der Metaebene, wie es beispielsweise in der Wissenschaftsgeschichte oder Wissenschaftsphilosophie der Fall ist, ist in den Kernlehrplänen der Fächer Biologie, Physik und Chemie nicht vorgesehen. Interessanterweise zielt der Kernlehrplan Philosophie für die Sekundarstufe II auf ebendiese Auseinandersetzung ab. Der KLP enthält für die Qualifikationsphase das Inhaltsfeld „Geltungsansprüche der Wissenschaften“, welches als inhaltliche Schwerpunkte „Erkenntnistheoretische Grundlagen der

Wissenschaften“ sowie den „Anspruch der Naturwissenschaften auf Objektivität“ thematisiert (KLP Philosophie Sek. II 31). Hier schlägt der Projektkurs eine potenzielle weitere, interdisziplinäre Brücke als Anregung für fächerübergreifenden Dialog in der Sekundarstufe II.

Es folgt ein exemplarischer Verlaufsplan, inklusive einer beispielhaften Kursbeschreibung, der in vier Sequenzen den Ablauf des hier präsentierten Projektkurses umreißt. Hierbei sind große Teile der ersten beiden Sequenzen in kooperativen Unterrichtsformen zu erteilen bevor daraufhin in der vierten Sequenz die eigenständige Arbeit der Schülerinnen und Schüler beginnt. Die ersten beiden Sequenzen haben somit oftmals noch einen „normalen“ Unterrichtscharakter – dieser Umstand ist der Tatsache geschuldet, dass das Verständnis der in der Literatur Djerassis aufgeworfenen, komplexen Fragestellungen erst gesichert sein muss bevor die Lernenden zur eigenständigen Arbeit übergehen können.

Zur Diagnose der Voreinstellungen der Lernenden wird der sogenannte „Draw-a-Scientist Test“ (DAST) durchgeführt, auf den ich in meiner Dissertation detailliert Bezug nehme. Dieser Test wurde erstmals in den 1950er Jahren vom Soziologen David Wade Chambers entwickelt und durchgeführt und seitdem viele Male wiederholt. Auf die simple Anweisung „Draw a scientist“ folgend – diese Anweisung soll im Projetkurs unbedingt auf Englisch erfolgen, um genderneutral zu formulieren – zeichnen die Lernenden ihre Vorstellung einer/eines *scientist*. Der DAST hat sich als wirkungsvolle Methode erwiesen, die Bilder und Stereotype von Kindern und Jugendlichen von Wissenschaften und Wissenschaftler*innen erkennbar zu machen und bietet sich daher als geeignetes Diagnoseinstrument für diesen Projektkurs an.

Um die besondere Verknüpfung von Realität und Fiktion in der Literatur Djerassis zu verdeutlichen, ist eine kurze Beschäftigung mit dem Autor selbst sinnvoll. Hierfür eignet sich, neben der eigenständigen Erarbeitung und Präsentation biographischer Informationen zum Autor, der Dokumentarfilm *Carl Djerassi – Mein Leben* (2009, Arte) von Joachim Haupt. Auf diese kurze zweite Sequenz erfolgt eine intensive Auseinandersetzung mit Auszügen des Romans *Cantor's Dilemma* (1989) sowie den Theaterstücken *Oxygen* (2001) und *Taboos* (2008). Neben der klassischen Literaturanalyse, welche die Lernenden im Rahmen des gymnasialen Oberstufenunterrichts bereits kennengelernt haben, sollten hier theaterpädagogische Elemente zum Tragen kommen werden, um die Dramen zu erörtern. Zudem sollten zur Erarbeitung zentraler Konzepte wie Gender und Kultur, die zum Verständnis von

Djerassis Literatur unabdingbar sind, Unterrichtsmethoden gewählt werden, die das selbstständige Arbeiten der Lernenden fördern.

Zu Beginn der dritten Sequenz legen die Schülerinnen und Schüler, in Rücksprache mit der Lehrkraft, ihre individuellen, dem übergeordneten Thema „The Culture of the Natural Sciences" entsprechenden Projektarbeitsthemen fest. Die darauffolgende, mit circa 40 Unterrichtseinheiten längste Sequenz endet mit der Präsentation und Diskussion der Projektarbeitsergebnisse. In der abschließenden Sequenz erfolgt die Abgabe der Portfoliomappen, die Reflexion des eigenen Lernprozesses, die Evaluation des eigenen Wissenszuwachses sowie dem Feedback an die Lehrkraft zu Unterrichtsinhalten und -methoden.

Exemplarischer Verlaufsplan des Projektkurses „Science-in-Literature: Gender in the Culture of the Natural Sciences in Carl Djerassi's Literary Works"
Grundkurs mit drei Wochenstunden, Gesamtumfang: ca. 80 Unterrichtseinheiten (UE)

Kursbeschreibung:

How do scientists do science? Probably all of us have rather specific images of how a scientist works – many of us think of old men in lab coats, motivated by a thirst for knowledge, working tirelessly to make new scientific discoveries. In his second career as an author of novels and plays, Carl Djerassi (1928 – 2015), world-famous chemist and joint inventor of the birth control pill, makes it his mission to reveal the 'secret' culture of the sciences. The culture of the sciences in Djerassi's literary works is characterized by brutal competitiveness and the significance of priority, namely being first to make a discovery. According to Djerassi, the issue of gender is central to understanding the sciences as a culture – the sciences are a culture made by men for men. The plots of his, as he calls them, 'Science-in-Fiction' and 'Science-in-Theater' works always serve a pedagogical purpose: The readers of Djerassi's novels and plays learn about specific scientific phenomena, be it tumorigenesis in cancer research, the discovery of oxygen, or the sciences behind reproductive technologies.

In this course, we are going to engage with our own ideas of science and explore Djerassi's portrayal of the sciences in (extracts from) his first novel *Cantor's Dilemma* (1989) and his plays *Oxygen* (2001) and *Taboos* (2005). Certainly, this course will include Djerassi's literary works but we will do so much more: we will research famous scientists and the science described in the literary works, we will discuss Djerassi's texts, we will act out scenes from some of Djerassi's plays, we will learn about the

history of women in science, we might even conduct our own research – and ultimately, you will work on your own 'Science-in-Literature'-related projects. Are you ready to look at science from a different angle?

Exemplarischer Verlaufsplan:

1. Sequenz: *What is a Scientist?* – Diagnose und Reflexion der Voreinstellungen der Lernenden	
ca. 3 UE[33]	• What is my image of a scientist? • Conducting, analyzing, and discussing the results of the "Draw-a Scientist Test (DAST)"
ca. 3 UE	Let's meet a scientist: The many lives of the polymath Carl Djerassi • Biographical information about Carl Djerassi • Screening and discussion of the documentary *Carl Djerassi – Mein Leben* (2009)
2. Sequenz: *Science in the Literary Works of Carl Djerassi* – Ein literarischer Blick auf die Kultur der Naturwissenschaften aus der Sicht Carl Djerassis	
ca. 20 UE	• What is Science-in-Fiction? What is Science-in-Theatre? – The Significance of the Genre(s) • Reading and discussing abstracts from Carl Djerassi's first Science-in-Fiction novel *Cantor's Dilemma* (1989) and his Science-in-Theater plays *Oxygen* (2001) and *Taboos* (2008)
3. Sequenz: Projektarbeit – *Working on and presenting individual projects*	
ca. 40 UE	Individual work on projects and project presentations (Hinweis: Bis zu 25 UE dürfen in eigenverantwortlichem Arbeiten erfolgen.)
ca. 10 UE	Presentation, discussion, and evaluation of projects
4. Sequenz: Evaluation des Projektkurses	
ca. 4 UE	• Reflexion des eigenen Arbeitsprozesses während der Projektarbeit, Abgabe der Portfoliomappen • Evaluation des eigenen Wissenszuwachses • Feedback an die Lehrkraft zu Unterrichtsinhalten und -methoden

[33] UE: Unterrichtseinheiten

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Summary (English)

This dissertation explores how gender functions as a foundational cultural feature in the literary works of Carl Djerassi, a chemist-turned-author who sought to educate non-scientists through fiction. Djerassi famously bridged the divide between what C. P. Snow termed the 'Two Cultures' of science and the humanities. While Djerassi's stated aim was science pedagogy, his novels and plays offer a deeper critique: using his insider knowledge as a former scientist, his literary works present a detailed portrayal of the hermetic culture of the sciences. The natural sciences in Djerassi's literary works are practiced within a distinct culture, resembling *tribal* features. As a tribe, Djerassi's scientists share a specific code of conduct, predominantly governed by gender-specific constructs which, disguised as rationality and objectivity, excludes women from the sciences.

Drawing from his own scientific background, Djerassi presents the tribal culture of the sciences as defined by competitiveness, legacy, territoriality, and – most significantly – gender. At its core, Djerassi reveals science not as a gender-neutral pursuit of truth, but a distinctly *masculine* culture. Success in science, as portrayed in his works, is tightly bound to performing manhood acts – masculinity in Djerassi's literary works, especially in his plays, has a *performative* quality. Hierarchy, male dominance behavior, and a lack of trust – driven by the race to be first to establish priority of a discovery – shape this masculine culture.

Throughout his novels and plays, Djerassi depicts women adopting – but also resisting – the code of conduct of this male-dominated world. In *Cantor's Dilemma* (1989), Jean Ardley and Celestine Price exemplify how female scientists use communication and cooperation to succeed, in contrast to their dysfunctional male counterparts. The character Leah Woodeson, a humanities PhD student, provides a critical outsider perspective, highlighting the absurdities of the scientific value system. In *The Bourbaki Gambit* (1994) and *Oxygen* (2001), Djerassi challenges history by foregrounding women's scientific contributions, often erased or minimized. These works question the myth of male scientific genius by attributing key achievements to overlooked female collaborators.

The novel *Menachem's Seed* (1997) and its dramatic adaptation *An Immaculate Misconception* (1998) offer a more complex female protagonist: Melanie Laidlaw, a reproductive biologist whose ambition leads her to ethically dubious actions. Unlike earlier female characters who outplay men through cooperation, Laidlaw's actions

raise critical questions about reproductive rights, motherhood, and gender inequality in science.

In *NO* (1998), Djerassi deepens his critique by including the issue of race alongside gender. Renu Krishnan, an Indian-American biologist, must deal not only with sexism but also with racial and cultural barriers. Her experience underscores the limits of white feminism in science and the need for intersectional awareness. Krishnan's cultural adaptability becomes both a survival strategy and a source of insight. Furthermore, the novel emphasizes the power – but also limits – of bonds of female solidarity in the sciences.

Phallacy (2012), Djerassi's final Science-in-Theater play, links the issue of gender in science to the Two Cultures debate of science *versus* art. Regina Leitner-Opfermann and Rex Stolzfuss represent these disciplines but also reveal the gendered dynamics within each. Stolzfuss, Djerassi's typical egocentric male scientist, reveals how misogyny often hides behind the mask of objectivity. Despite her flaws, Leitner-Opfermann shows greater self-awareness, suggesting that transformation is possible through critical reflection and constructive dialog.

Across these works, Djerassi challenges the one-dimensional ideal of objectivity of science and the scientist and directs the attention to science as a *construct* as well as to the subjectivity – and the subjective biases – of the scientist. In doing so, he relativizes the sciences' claim to truth as independent of cultural or personal factors and highlights the discursivity of science. Djerassi' scientists are presented as surprisingly naïve, displaying a striking unawareness regarding the cultural dimensions of their own discipline.

Most significantly, I argue that Djerassi functions as an ally to feminist science critique. Following Almassi's theory of *male feminist allyship*, Djerassi uses his credibility within the scientific community to challenge its rigid norms and amplify marginalized voices – especially those of women. His fiction not only 'smuggles' science pedagogy but, in fact, feminist discourse into the minds of his readers, particularly his powerful male peers in science, who might otherwise resist such perspectives.

Finally, in the appendix of my thesis, I explore the interdisciplinary potential of Djerassi's literary works as tools for science education in secondary schools, with a focus on drama and gender-specific issues in science. The thesis culminates in a proposed interdisciplinary project course for German *Gymnasium*, integrating Djerassi's texts with discussions on gender, ethics, and science.

Zusammenfassung (Deutsch)

Diese Dissertation analysiert eine Auswahl der *Science-in-Fiction* Romane und *Science-in-Theater* Stücke Carl Djerassis hinsichtlich ihrer Kritik an der Rolle von Gender in den Naturwissenschaften. Djerassi, ein renommierter Chemiker, beschreibt die Naturwissenschaften als eine Stammeskultur, geprägt von Konkurrenz, dem Streben nach Anerkennung und Priorität. Diese Kultur ist, so argumentiert diese Arbeit, stark durch Geschlechterrollen geprägt. Durch seine literarisch-anthropologische Sichtweise auf die Wissenschaftskultur als Konstrukt hinterfragt Djerassi den eindimensionalen Objektivitätsanspruch und häufig unreflektierten Wahrheitsanspruch der Naturwissenschaften.

Die Dissertation zeigt auf, inwiefern die Strukturierung nach Genderkriterien die *zentrale* Eigenschaft der Stammeskultur der Naturwissenschaften ist. So kann beispielsweise das von Djerassi oftmals thematisierte extreme Konkurrenzverhalten in den Naturwissenschaften als männliches Verhalten verstanden werden. Die historische Unterrepräsentanz von Frauen in den Naturwissenschaften steht somit in Zusammenhang mit einer männlich dominierten Wissenschaftskultur, die als *hostile environment* – als ein für Frauen feindliches Territorium – verstanden wird.

Im Roman *Cantor's Dilemma* (1989) wird das weibliche Forschungsteam dem dysfunktionalen männlichen Team gegenübergestellt – dabei wird deutlich, wie sich geschlechtsspezifische Kompetenzen wie Kommunikation und Kollaboration positiv auf wissenschaftliche Arbeit auswirken können. Figuren wie Leah Woodeson kritisieren die Wissenschaftskultur aus der Perspektive der Geisteswissenschaften und zeigen die Absurditäten des spezifischen wissenschaftlichen Verhaltenskodex auf.

Mit dem Roman *The Bourbaki Gambit* (1994) und dem Theaterstück *Oxygen* (2001) beteiligt sich Djerassi an feministischen Bemühungen, indem er Frauen in der Wissenschaftsgeschichte sichtbar macht. Er zeigt, dass der Ausschluss von Frauen nicht zufällig, sondern politisch und misogyn motiviert ist. Historische Figuren wie Madame Lavoisier und fiktive Charaktere wie Diana durchbrechen den Mythos des männlichen Wissenschaftsgenies.

Der Roman *Menachem's Seed* (1997) und seine dramatische Adaption *An Immaculate Misconception* (1998) bieten ein komplexeres Bild einer Wissenschaftlerin, Melanie Laidlaw, deren ethisch fragwürdiges Verhalten Diskussionen über Reproduktionstechnologien und Geschlechtergerechtigkeit auslöst. Ihre Mutterschaft

führt zu einer Selbstreflexion, die ihrem männlichen Kollegen Frankenthaler fehlt, der als typisches Mitglied von Djerassis *science tribe* fungiert.

Der Roman *NO* (1998) erweitert die Perspektive um intersektionale Aspekte: Renu Krishnan, eine indisch-amerikanische Wissenschaftlerin, kämpft gegen Sexismus und kulturellen Barrieren. Ihre Erfahrungen verdeutlichen die Grenzen des weißen Feminismus und betonen die Notwendigkeit eines inklusiveren Verständnisses von Geschlecht in der Wissenschaft. Die Solidaritätsnetzwerke weiblicher Figuren - die *bonds of female solidarity* – verdeutlichen sowohl Stärken als auch Grenzen feministischer Unterstützung.

In seinem letzten Science-in-Theater Werk *Phallacy* (2012) thematisiert Djerassi die *Two Cultures*-Debatte zwischen Wissenschaft und Kunst anhand des Konflikts zwischen dem Chemiker Rex Stolzfuss und der Kunsthistorikerin Regina Leitner-Opfermann. Ihre Rivalität verweist auf tief verwurzelte Geschlechterstereotype, wobei Stolzfuss als typischer Vertreter der *science tribe* erscheint, der sein männliches Dominanzstreben mit vermeintlicher Wissenschaftlichkeit maskiert. Leitner-Opfermann hingegen zeigt mehr Selbstreflexion.

Djerassis Oeuvre dekonstruiert den Mythos wissenschaftlicher Objektivität und zeigt Wissenschaft als kulturell geprägten, männlich dominierten Bereich. Seine männlichen Figuren zeigen oft eine auffällige kulturelle Naivität und tragen so zur Aufrechterhaltung systemischer Geschlechterungleichheit bei. Djerassis Darstellung knüpft an historische Ausgrenzungsmechanismen des 18. und 19. Jahrhunderts an und hinterfragt das tief verwurzelte Bild des rationalen, obsessiven männlichen Wissenschaftlers.

Auf Grundlage der Theorie der *male feminist allyship* von Ben Almassi argumentiert die Arbeit, dass Djerassi als ‚Insider' seine Autorität nutzt, um Wissenschaftskultur zu kritisieren und marginalisierten, vor allem weiblichen, Stimmen Gehör zu verschaffen. Seine Werke ‚schmuggeln' nicht nur wissenschaftliches Wissen, sondern auch feministische Diskurse in die Wissenschaft ein, insbesondere gerichtet an einflussreiche männliche Wissenschaftler, die solchen Ideen sonst wenig Aufmerksamkeit schenken würden.

Abschließend wird das interdisziplinäre Potenzial von Djerassis literarischen Werken für den Unterricht an weiterführenden Schulen untersucht, mit Fokus auf Drama und genderspezifische Fragestellungen. Die Dissertation schlägt einen interdisziplinären Projektkurs für die Sekundarstufe II vor, der Djerassis Texte mit Diskussionen zu Gender, Ethik und Wissenschaft verbindet.

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Dilara Serhat-Sawitzki
Dortmund, Juni 2025

Eigenständigkeitserklärung

Hiermit erkläre ich,

- die vorliegende Dissertation selbstständig verfasst und ohne unerlaubte Hilfe angefertigt habe.
- dass ich die Stellen der Arbeit, die dem Wortlaut oder dem Sinn nach anderen Werken (dazu zählen auch Internetquellen und KI-basierte Tools) entnommen sind, unter Angabe der Quelle kenntlich gemacht habe.

Alle Hilfsmittel, die verwendet wurden, habe ich angegeben. Die Dissertation ist in keinem früheren Promotionsverfahren angenommen oder abgelehnt worden.

Dortmund, 30.06.2025

Dilara Serhat-Sawitzki