Laboratory science:

representations of reproductive biology in Carl Djerassi's

an immaculate misconception: sex in an age of mechanical reproduction

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Abstract

Carl Djerassi's *An Immaculate Misconception: Sex in an Age of Mechanical Reproduction* belongs to science-in-theatre genre. The play revolves around the incidents in a reproductive biology laboratory, and investigates the ethical implications of Intracytoplasmic Sperm Injection, a path-breaking scientific innovation in the field of Assisted Reproductive Technology. In selecting key scientific themes as the subject matter of his literary works, Djerassi attempts to disseminate scientific ideas to a non-scientific audience. This is a significant step towards narrowing the gap of mutual incomprehension between scientists and non-scientists.

Keywords

Carl Djerassi, Ethics, Artificial Reproduction, Two cultures, Intracytoplasmic Sperm Injection

Introduction: Two Culture Debate and Science-in-theatre Genre

C.P. Snow, a scientist and a literary figure, once lamented the mutual incomprehension between sciences and humanities. In his 1959 Rede Lecture, he stated that "It is bizarre how very little of twentieth-century science has been assimilated into twentieth-century art" (16) [4]. Carl Djerassi, an Austrian-born Bulgarian American chemist, novelist and playwright, took Snow's idea forward. By establishing a new genre titled 'science-in-theatre' in the late 1980s, Djerassi initiated the concept of 'the third culture.' In this genre, the theatre serves as a platform to spread awareness about scientific ideas among non-scientists. In "Contemporary 'Science-in-theatre': A Rare Genre," Djerassi states that "Instead of starting with the aggressive preamble 'let me tell you about my science', I prefer to start with the more seductive 'let me tell you a story, and then incorporate real science and true to life scientists into the tale" (193) [2]. Djerassi believes that this genre could bridge the gap between the two cultures—science and the arts. In so doing, Djerassi attempted to merge these two cultures or arrive at a third culture where literary intellectuals and scientists could communicate with each other, tapering the gulf of mutual incomprehension.

The program note and the plot of *An Immaculate Misconception*: *Sex in an Age of Mechanical Reproduction*

Djerassi's *An Immaculate Misconception: Sex in an Age of Mechanical Reproduction* (2000) exemplifies his vision. In the play, Djerassi investigates the ethical aspects of Intracytoplasmic Sperm Injection (ICSI), a path-breaking scientific innovation in the field of Assisted Reproductive Technology (ART) which helped cure male infertility. The observation of the critic Kristen Shepherd-Barr is noteworthy in this regard: "Djerassi's play deals with the intricacies of fertility in the modern age. All these plays are grounded in first hand knowledge not

just of the science they engage with but of the laboratory culture that produces the scientific results from which we all benefit" (122) [5]. In the Program Note, Djerassi dramatizes the findings of Gianpiero Palermo, Hubert Joris, Paul Devroey, and Andre C. Van Steirteghem from the University of Brussels. In 1992, these renowned scientists published a work in *Lancet* in which they "announced the successful fertilization of a human egg with a single sperm by direct injection under the microscope, followed by reinsertion of the egg into the woman's uterus" (xiii) [1]. Djerassi uses such a scientific idea (ICSI) as the subject of *An Immaculate Misconception: Sex in an Age of Mechanical Reproduction* play and disseminates this to a non-scientific audience. The play revolves around the laboratory lives of characters such as Melanie Laidlaw, a Reproductive Biologist who works at an American Infertility Research Centre, and Felix Frankenthaler, the American infertility specialist who is Melanie's research collaborator. Melanie's relationship with Menachem Dvir, an Israeli nuclear engineer, forms the basis of several conflicts in the play. The ethics of authorship takes center stage when the principal characters involve themselves in disputes regarding the authorship of their collaborative research findings, which were to be published in a journal. The issues of ethnicity and genetic determinism come up surrounding the ICSI procedure, which further problematize the sperm bank conduct and the sperm donor's consent issue.

Laboratory on Stage

The metatheatrical device features prominently in several parts of the play. The properties of the stage turn the theatrical space into a laboratory: stools, a lab table, petri dishes, a pipette dispenser, tubes, a centrifuge, and a large microscope with a double eyepiece. In this laboratory space, Melanie discusses her dream project, ICSI, where she constantly yearns for a "scientific company" (15) to materialize her dream [1]. Using human subjects for the experiment, Melanie chose to

prove that those with low sperm count (who cannot become biological fathers) could attain fatherhood. She plans to inject single, compatible sperm directly into the egg and also to implant the embryo into the uterus rather than struggle with lots of sperm in one egg as prepared in IVF (In Vitro Fertilization). Furthermore, with ICSI, Melanie attempts to achieve "collective motherhood" (19) through reproduction under the microscope, which, according to her, represents the dream of professional women who desire to postpone childbearing to late thirties or early forties: "The science of…A…R…T (*Beat*): assisted reproductive technologies. Young men and women will open reproductive bank accounts full of frozen sperm and eggs. And when they want a baby, they'll go to the bank to check out what they need" (21) [1]. If ICSI is efficacious, it would be an exemplary addition not only to the field of ART but would also absolutely transform the professional lives of women in science.

The theatre becomes a lab in yet another critical scene while detailing the ICSI procedure and its ethical aspects to a non-scientific audience. The playwright illustrates (with images) the scientific processes involving sperm immobilization before injection and ICSI. The procedures extends from holding the pipette to the sperm injection. With the help of a lab table, microscope, micromanipulators, a VCR unit, a projector, a surgical gown, and a cap, the playwright introduces the ICSI arrangement on the stage. During the procedure, the conversations between Melanie and Frankenthaler bring out the ethical aspects of laboratory research involving ICSI. One of the questions concerns the right of a collaborator to know the details of the experiment, including the source of the sperm and its receiver. During the investigation, Melanie initially experimented on the two eggs with Menachem's sperm. Primarily, she removes the tail of the moving sperm to restrict the movements of the sperm. Melanie injects that sperm into the egg and performs an identical experiment for the second one with a beautiful penetration. After a brief conversation,

Frankenthaler realized that Melanie employed her eggs for the experiment. He was stunned and agitated that his collaborator concealed the identity of the sperm and the egg. The furious Frankenthaler confronted Melanie for not obtaining the donor's consent. Frankenthaler detailed the ethics behind ICSI, but Melanie justified herself by claiming that she was against adopting a child and desired to become a biological mother. She has chosen the man she has met at the conference and decided that he could become a biological father to her child, knowing well that Menachem is married but is childless. Their conversations in the laboratory space spell out the ethical sides of scientific investigations.

Allusions and stylistic markers in the play

Much like Shakespearean and Greek plays, Djerassi's work begins with a prologue that sets the stage for transporting the readers to the preceding incidences. Situated in 2014, the first ICSI baby, quite symbolically named Adam, relates his life journey. According to the Biblical Garden of Eden story in the *Book of Genesis,* Adam is God's first human creation, and such an analogy in the play appears appropriate in the ICSI context too. Correspondingly, the immaculate conception of Jesus Christ is alluded to in the title. If Virgin Mary immaculately conceived Jesus, Melanie immaculately misconceived Adam. The latter refers to the 'immaculate misconception' that becomes a bone of contention in the play. In ICSI, there is an "impending separation of sex ("in bed") and fertilization ("under microscope") (xi) [1]. In the prologue, Adam, the reproduced object, recollects the days when his mother's reference to the first ICSI baby gradually changed from my ICSI baby to the ICSI baby:

> It sounded cuddly, the way she said "ICSI"… a new term of endearment….Another time I do remember hearing "ICSI," it came across very differently….She was talking about "the"

> ICSI baby on the telephone and it didn't sound cuddly…The, instead of my, sounded clinical…as if she'd converted me into an oddball or a milestone in medicine. (Underline in original, 1) [1]

Djerassi's signature style lies in the use of stylistic markers such as underlining, italics, and quotation marks. The discussions between Frankenthaler and Melanie on ICSI boil down to my method vs. our method. Further, the definite article "the" and the possessive pronoun marker "my" are used to show how the ICSI baby is estranged from the conceiver of the idea, the mother. In his characteristic style, Djerassi underlines words to emphasize the importance of ownership in research. Similar themes and stylistic techniques play out in Djerassi's co-authored play with Roald Hoffmann titled *Oxygen* (2001). "My fire . . . my dephlogisticated air… my oxygen" (107) are references from *Oxygen* in which the playwrights explore the question of what it means to be first in a discovery [3]. In *An Immaculate Misconception*, Frankenthaler worries about the failure of a critical experiment, but Melanie reassures him that there would be a possible success in the investigation. As he is afraid that oligospermia (Menachem suffered from low sperm count because of a radiation accident) might cause a severe genetic disorder, Frankenthaler decides to follow his method for ICSI. Such a decision results in frequent disputes between the collaborators.

The play's subtitle, *Sex in an Age of Mechanical Reproduction*, derives its title from the theorist Walter Benjamin's celebrated work titled "The Work of Art in an Age of Mechanical Reproduction" (1936). To explain the complications involved in the ICSI procedure, Djerassi invokes Benjamin's concept of 'aura.' According to Benjamin, the reproduced object extricates itself from the domain of tradition, leading the object to lose its authenticity, which he terms 'aura.' Djerassi distinguishes between the natural processes of sex in bed and assisted reproduction under the microscope in ICSI. Djerassi extends Benjamin's metaphor to the field of reproductive biology,

where the child becomes the reproduced object: "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'" (197) [2]. By drawing on Benjamin's concept of 'aura,' Djerassi deliberates on Adam's predicament who thinks that his mother turned him into a milestone in medicine.

Interludes and Dream Sequences

Conferences form an integral component of scientific research, and Scene 1 of the play begins with a Scientific Congress, where Melanie and Menachem meet. The meeting of these scientists not only lays the foundation of ICSI but also symbolically represents the global dissemination of scientific ideas. The audience witnesses an American reproductive biologist meeting with an Israeli nuclear engineer at a scientifc conference in Austria. Such an international setting helps in showcasing the worldwide spread of science and technology. Menachem develops a relationship with Melanie and increasingly grew curious about her background. Melanie discloses that she is a childless widow, and Menachem reveals the details of his married life. After ending this short introduction in the conference, Melanie returned home, only to receive an email from Menachem. They continue their relationship through email conversations that form interludes in the play. These short dramatic sections, termed interludes, highlight how technological advancements bond these characters. Several email exchanges between Menachem and Melanie are neatly spliced within the Acts and the Scenes in the play. Much like the conferences, these email exchanges bring the characters closer to each other, who are otherwise set apart by nations.

In a dream sequence, Djerassi brings out the novel idea of a sperm bank office. Melanie visits a sperm bank to 'withdraw' one spermatozoon. However, the sperm bank's policy of keeping the donor's identity anonymous dissuades Melanie from withdrawing the sperm. Instead, after her intercourse with Menachem, she collects Menachem's seed in a condom, which Melanie subsequently inserts in a wide-mouth Dewar flask. The plotline of *An Immaculate Misconception* could be traced back to Djerassi's 1988 novel titled *Menachem's Seed*. By drawing parallels with the bank's operation, the playwright explains to a non-scientist audience the complexities involved in sperm donation.

Ethics: Authorship and Consent

Frankenthaler's switching of the sperms without Melanie's consent brings up an added ethical characteristic surrounding their laboratory life. Before Melanie enters the lab, Frankenthaler finishes injecting sperm into the egg. Melanie is unhappy about this development as they had decided "to proceed together" (56) [1]. A slight debate follows regarding selecting two embryos out of four for implantation into her uterus. Melanie wants to conduct the experiment independently, but Frankenthaler is an expert in embryo selection. So he refuses her proposal and chooses two best embryos. Further, in the Infertility Clinic, Frankenthaler and Menachem meet each other. Ironically enough, Menachem is uninformed of Melanie's child's identity. Menachem is curious to know about the father of that child. Frankenthaler gives a brief description of the sperm donor. During his conversations with Menachem, Frankenthaler learns that Melanie and Menachem had first met at a scientific conference in Austria. While Menachem thought that Frankenthaler was the father of the child, Frankenthaler informs him that he was merely a partner in this ICSI experiment or the partner in the procedure: "We're partners…in reproduction. You

might say we're the parents of a procedure that will produce a baby within a couple of months" (88-89) [1]. Frankenthaler discusses their work with Menachem and the ICSI technique, in which he explains how they have transferred the resulting two embryos into her uterus. Additionally, Frankenthaler mentions that Melanie is working on a future project of separating X and Y chromosomes for gender specification. Several ethical issues are at the heart of Melanie and Frankenthaler's debate on the sperm and the fertilization procedure. Frankenthaler asks her to watch the sperm capture video, which he uses to fertilize. In this conversation, Frankenthaler reveals that in half an hour break they had, he visited a sperm bank and took a new sperm sample. Frankenthaler admits that he fertilized the egg with sperm from the sperm bank instead of Menachem's sperm. Frankenthaler fears that radiation accident victims' sperm for their ICSI procedure may lead to severe mutation in the child and would potentially kill their ICSI efforts.

Menachem is curious about Melanie's possession of *his* sperm without *his* consent. After his conversation with Frankenthaler, Menachem is excited about the ICSI method. When he understands that she has conceived with the help of ICSI, Menachem questions her about the child's father. When Melanie reveals that the child resulted from Menachem's sperm, he is stunned because he had considered himself infertile owing to oligospermia. Since Melanie is unsure of ICSI's realization, she does not want to raise his hopes without concrete proof. Melanie confesses that after their sexual intercourse, she took the used condom, inserted it into a flask filled with liquid nitrogen, and froze the sperm sample for her experiment. While Melanie argues that she has "acquired" the sperm, Menachem professes his disagreement by stating that she "stole" and "hid" the sperm (97) [1]. Menachem grows furious at Melanie for appropriating his sperm without his accord.

Absolute uncertainty surrounds the ICSI procedure, leaving Melanie, Menachem, and Adam in an indeterminate state. Frankenthaler uses two different sperm samples to experiment with her eggs, leading to the non-confirmation of the sperm's identity. Melanie didn't know the biological father of Adam; hence, only a DNA paternity test could confirm the biological father of the child. Melanie initially refuses Frankenthaler's requests for DNA analysis of Adam and Menachem because she doesn't want her child to belong to anyone else other than Menachem. Frankenthaler was even more curious to know the biological father after hearing about her private marriage with Menachem. Melanie discloses to Menachem what transpired during the sperm injection. She informs that Frankenthaler desires a DNA analysis for Adam to confirm his genetics. After listening to the entire situation, Menachem agrees to a DNA analysis but promises that no one will see the result other than Adam after he grows up. Until then, the DNA result will remain in a sealed envelope.

Disagreements erupt on the authorship concerning the forthcoming research article on ICSI. Frankenthaler interrogates Melanie about the ICSI paper because he is unaware of the sperm donor's identity, and he desperately wants to know it. Melanie conveys that it an obvious choice to have her name as the first author as ICSI was her idea: "I [Melanie] come first, because I thought of the idea. And then I reduced it to practice. Furthermore, it's my egg" (106) [1]. During Frankenthaler's conversations about the ICSI paper for possible publication in a journal, he is furious at Melanie for relegating his contribution to "a measly acknowledgment" (121) [1]. The disputes continue on the issue of authorship and lead to a larger debate surrounding the attribution of credit in research papers.

In the year 2011, Adam appeared on the stage holding a brown manila envelope in his hands and talked about his family. His father's eyes well up while handing over the envelope to

Adam. According to his mother, he is big enough to know the result of the DNA analysis. Adam is all set to confirm the identity of his father; he stands on the stage, opens the envelope, finds X-strips, and transposes the strip against the other. Menachem neatly summarizes what ICSI meant to different persons involved in the procedure: "To him [Frankenthaler], Adam is ICSI… the product of a scientific invention. Of course, to you [Melanie], Adam is our precious baby… but he's also your ICSI baby. (*Beat*). Yet what about Adam when he's grown up… ready to lead his own independent life? What will ICSI represent to him? A gift? Or a burden? What will paternity mean to him (beat)… then? (127) [1]. These statements shed light on the dilemma faced by the reproduced object—the ICSI baby. The final background of the play reflects Adam's predicament. Lights dim, and Adam experiences mixed emotions: relief, shock, and puzzlement. The play ends inconclusively.

Conclusion

Djerassi's *An Immaculate Misconception: Sex in an Age of Mechanical Reproduction* discusses key themes in laboratory science. Although key scientific innovations such as ICSI altered the face of twentieth-century medical science, they are not without challenges. Djerassi's play walks the readers through the careworn life of scientists in the laboratory space. In discussing the scientific techniques, Djerassi introduces them to a scientifically untrained audience. The story of Melanie, Frankenthaler, Menachem, and Adam is essentially the story of ICSI. In addition, the play also sheds light on the ethical debates that plague scientific research at large: due attribution in research publication, the ethics of consent during artificial reproduction, and the role of women in science.

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