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Book Review

NO: a novel by Carl Djerassi

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NO: a novel by Carl Djerassi The University of Georgia Press, 330 Research Drive, Athens, GA 30602; London, 1998. xiii + 276 pp. 14.0 x 22.8 cm. $24.95 (hardcover), ISBN 0-8203-2032-3.

Is Carl Djerassi an academic chemist, an industrial chemist, or a creative writer? The answer: All three! The author of more than 1200 scientific publications and eight monographs, Djerassi is the recipient of numerous awards such as the 1973 U.S. National Medal of Science (for the first oral contraceptive), the 1991 U.S. National Medal of Technology (for novel approaches to insect control), the 1992 Priestley Medal (the American Chemical Society's highest award), the 1997 Willard Gibbs Medal of the ACS Chicago Section, and Sigma Xi's 1998 William Procter Prize for Scientific Achievement (to be awarded at the society's annual meeting this coming November in Vancouver, British Columbia). He is the founder of the Djerassi Resident Artists Colony near San Francisco that to date has supported almost a thousand artists in various disciplines, including Nobel chemistry laureate Roald Hoffmann as a three-time poet in residence. Djerassi is an avid art collector and Professor of Chemistry at Stanford University. After a half-century of dual research careers in industry and academe, Djerassi, like chemist–spectroscopist–novelist C. P. Snow, has embarked on a third career in creative writing, which we have followed with a mixture of growing interest, admiration, and anticipation [1].

Djerassi's new career was catalyzed by two brushes with death—the 1978 suicide of his daughter Pamela, an artist, which led to his founding of the Artists Colony, and his 1985 cancer surgery, both of which brought him to terms with his own mortality and convinced him that time was a precious commodity. His nonresearch writings include individual and collected short stories [2], poetry [3], autobiography [4, 5], essays [6], a television and videocassette program [7], a novel [8], and a tetralogy of novels [9–11] which exemplify what he calls "science-in-fiction" to differentiate it from the better-known science fiction. In this genre, which he uses to "make comprehensible [to nonscientists] the culture and behavior of scientists—uncommon in contemporary fiction," most of his characters, fictional as well as real, are scientists, and "everything [he specifies] does or could exist."

Cantor's Dilemma [9], the first novel in the tetralogy, dealt with the themes of trust, ambition, the mentor–protégé relationship, and women in science. *The Bourbaki Gambit* [10], the second novel, a fictionalized account of the development of the Nobel Prize-winning polymerase chain reaction (PCR), concerned scientists' passionate desire for recognition by their peers, the inherent collegiality of science, and the "graying" of Western science as prominent scientists age and face the prospect of retirement. *Menachem's Seed* [11], the third and shortest novel, treated the ethical question of whether or not a woman has a right to appropriate without consent the discarded sperm of a man who believes himself to be infertile in order to achieve pregnancy via today's "miracle techniques" (Djerassi currently teaches "Ethical Discourse through

Science-in-Fiction" [Medicine 256], a graduate course offered under the auspices of the Center for Biomedical Ethics of Stanford University's School of Medicine [12]). In this seminar students write short stories dealing with the moral complexities of science; one of these stories appeared in a recent issue of *Chemical and Engineering News* [13], the first time in its 75-year history that the magazine has published a short story.

Because the conclusion of *Menachem's Seed* left a number of issues unresolved, we eagerly anticipated the publication of the last novel of his tetralogy, *NO*, a title that stands for both the simple negative expletive and the chemical formula for nitric oxide, the simple diatomic species that was named "Molecule of the Year" by the multidisciplinary journal *Science* in 1992. Nitric oxide plays a complicated and sophisticated role in the human body, where it serves as a chemical messenger in a wide variety of functions, including penile erection, leading to its use in the treatment of male impotence (euphemistically called erectile dysfunction), which Djerassi has used in *NO* as the vehicle for illustrating the role of a biotechnology company in contemporary biomedical research. Thus, although it has been involved in the previous novels, here, as in *Menachem's Seed*, sex—more precisely, human male reproduction—occupies center stage. (In his more than four decades of research and teaching, Djerassi has devoted himself to reproductive biology with emphasis on female contraception.)

As in the earlier novels, Djerassi offers the reader many insights into various topics of interest to different readers. For those concerned with gender issues he discusses intermarriage; feminism; single motherhood; the "glass ceiling" encountered by women in the professions; a woman's "biological clock;" the overwhelmingly patriarchal clan culture in which his characters live, work, and interact; the difficulties that a professional woman faces in balancing work, marriage, and family; and the urgent need for suitable role models for women contemplating scientific careers. For entrepreneurs interested in starting up a small biotech company, he considers the raising of cash, investment, venture capitalism, selection of board and committee members, stock options, IPOs, secondary offerings, underwriter wheeling and dealing, incentives, the manipulating power of financial analysts and journalists, networking, clinical trials, manufacturing, marketing, research and development, FDA regulations, the American regulatory bureaucracy, frivolous class-action suits, and class-action shysters. For scientists he deals with issues such as tenure, grantsmanship, academic–industrial interactions, apportionment of credit among authors, competition, the National Academy of Sciences and other organizations; the need (Djerassi characterizes it as "lust") for validation, recognition, and awards (especially the Nobel Prize) that is both the nourishment and detriment of a creative mind; the tribal nature of the research scientist's culture and mores; the dependence of scientific reputation on the approbation of the researcher's peers; and the relationship of creative and sexual energy. The reader will also be enlightened on myriad fascinating topics such as the Bible; the Koran; music; opera; religious conversion; Jewish laws, customs, and holidays; and, of course, the practice of science itself.

In addition to describing how that subculture of small, entrepreunerial, research-driven enterprises known collectively as the biotech industry exists in an uneasy relationship with contemporary science, Djerassi returns to another of his principal concerns, "the historic marginalization of women in the male-dominated scientific universe and the attempts of modern women, as well as some men, to change this state of affairs" (p xi). It is not surprising that the developer of the first oral contraceptive, "one of the single greatest liberating influences for women," should be an ardent feminist, a conversion fostered by his third and present wife, Diane Middlebrook, Distinguished Professor of English at Stanford. In fact, although Djerassi has been called the "Father of the Pill;" he prefers the appellation "Mother of the Pill." Thus most of his female characters are strong, independent, take-charge women such as Melanie Laidlaw in *Menachem's Seed* and Renu Krishnan in *NO*.

The emphasis on the female perspective and point of view is especially evident in *NO*. All of the 30 episodes of stream-of-consciousness thoughts (set in italics) that provide flashbacks, fantasies, and character motivation are those of either Renu (28) or Melanie (2). Similarly, all of the 12 letters are those of Renu (11 to her brother Ashok in Bangalore, India's Silicon Valley) or Melanie. Melanie’s letter is written to her former lover Menachem Dvir, a vice president at the Ben-Gurion University in Beersheba and a married man who believes he was rendered infertile by exposure to radiation. In the letter she reveals how she stole his sperm (*Menachem's Seed*) to use in intracytoplasmic sperm injection (ICSI), the revolutionary fertilization technique

of the early 1990s involving injection of a single sperm into an egg. The letter is reproduced in *NO* (pp 84–89) from *Menachem's Seed* (pp 177–185), thus directly linking the third and fourth novels. All together, these items of female thoughts and musings comprise almost a third of *NO*.

But in *NO* Djerassi has also combined the theme of the woman in science with that of another recent phenomenon, "the remarkable Asianization of the American academic research laboratory." As is well known, at many American universities the majority of graduate students in certain disciplines are Asians. Djerassi feels that although Indian women do not suffer most of the language problems encountered by Chinese or Japanese scientists working in the United States, they, like all Asian women in contemporary American science, are 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" (p xii). Consequently, although she was only a minor character in *Menachem's Seed,* Djerassi has made Renu the prototypical protagonist of *NO*, in which she "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 [Djerrasi was born on Oct. 29, 1923 in Vienna, Austria and raised in Vienna and Sofia, Bulgaria before emigrating to the United States in 1939] turned fiction writer in his adopted language" (p xii).

In *Menachem's Seed* and *NO*, which take place in the pre-Viagra era and involve many of the same characters, Renu, who had emigrated from Madras in her native India, had graduated from Wellesley College, and had received her Ph.D. from Stanford University, became a postdoc of Dr. Felix Frankenthaler at Brandeis University's Rosenstiel Basic Medical Sciences Research Center where she discovered how NO is produced in the body and its role in vasodilation. Supported by a grant from Dr. Melanie Laidlaw, the widow of a prominent Columbia University biochemist and the American director of REPCON (Reproduction and Contraception), a foundation supporting research in reproductive biology, Renu travels to Jerusalem to work on clinical applications of synthetic NO-releasers (NONOates) with Dr. Yehudah Davidson of the Hadassah Medical Center, who sends her to Ben-Gurion University at Beersheba to work with bioengineer Dr. Jephtah Cohn, a secular Jew obsessed with his *mamzerut* (illegitimate birth status), on possible devices for delivering NO to the penis by means of his MUSA (medicated unit for sexual arousal).

In *NO* Renu and Jephtah become romantically involved, marry, and eventually have a daughter, Naomi, and a son, Ravi. Renu rises to the presidency of SURYA, Inc., a company (named after the Hindu sun god) formed to produce and market their products. She sells part of her stock to subsidize her husband's company, OV, Inc., and its subsidiary, Radha, named after the Hindu deity Krishna's favorite *gopi* (cowgirl), to manufacture and market his Tele-Ov, a vaginal diagnostic device to determine the time of ovulation. Renu, having tasted power (she tells her brother that "executive power does not 'turn me on'") and having made millions, resigns her presidency to "return to her roots as a scientist." She devotes herself to industrial biochemical research "to once more start with a basic scientific observation and to carry it all the way to final application in man—a process that is impossible in a university" (p 272). Not forgetting her Indian roots and knowing that "some of the most dramatic applications of nitric oxide are in parasitology and tropical diseases" and that big drug firms are "not interested in the comparatively unprofitable market represented by the poor of the Third World," she decides to seek cures for diseases caused by parasites that are highly vulnerable to nitric oxide.

> Inasmuch as Renu is the central character around whom almost all of the novel's action revolves, we asked Rowena Rege, a female Indian graduate student in our department who is married to an American, for her impression of Djerassi's depiction of Renu:
>
> When Carl Djerassi decided to pen *NO*, he chose Dr. Renu Krishnan, a Hindu female who emigrated to the U.S.A. from India, as the main character — definitely a massive undertaking for a 74-year-old Jewish man. In my opinion he was only marginally successful in this undertaking.
>
> Renu, as one learns early in the novel, moved to the U.S. for an education and stays. One would imagine that she would pick up the local vernacular and customs without forgetting those of India.

However, this is not consistently seen throughout the novel. In the beginning she criticizes her brother for using the British term "advert" for advertisement, but she should know that he lives in a country where the British term is used everywhere for everything (p 7)! Djerassi appears to be trying to point out the differences in the cultures at this point, yet he only manages to portray his main character as an Indian who does not understand her own country's history. And, later in the novel, she herself uses a very British phrase: "He was very sporting about it all" (p 115).

The advertisement in the "Match Makers" section of the newspaper *Indian Express* taken out on her behalf by her family requests that a horoscope be supplied with the reply. Renu has a fit about this supposedly antiquated custom and appears not to understand its purpose. This shows a complete lack of the author's understanding of the fundamentals of the caste system, which is the key to understanding a Hindu and a Brahmin. In his haste to portray his main character as modern, he seems to forget her ties to her early, formative years in India, being raised in the Hindu religion by her Brahmin family.

An additional point of contention is Renu's letter to Professor Felix Frankenthaler dated April 8, 1978 (pp 9–12). It is just too personal. A woman, and one from India to boot, would not write a letter to a professor discussing hair dryers and female sundries! Also, one would hardly expect an immigrant from India to forget about the different voltages used in various countries.

This raises another point—most Indians visit their homeland at least once in a while. Yet none of her letters to her brother over the years indicate any visits that she has made or plans to make to India, including the letter mentioning the death of her mother.

As a career-oriented Hindu woman married to a career-oriented Jewish man, Renu would have been expected to hire an Indian or a Jewish woman as an *au pair*. In this way, the children would be exposed to at least one of their two cultures at all times — even when both parents were at work. However, her first nanny was a British 22-year-old woman with red hair, and her second was a 53-year-old Nicaraguan woman! Both these nannies, especially the second one, seem very unreasonable choices for a Hindu married to a Jew.

As the novel progresses, the development of Renu's character is lacking. The only exception is when she realizes that she was partially to blame for her husband's infidelity. Most of her thoughts throughout the novel are with the company, the product, and their progress. The in-depth character development one expects to see in a novel following its main character over several years is not present.

The book deals mainly with the science part of "science-in-fiction". Thus it is possible that Djerassi did not have the time or space to explore the various depths of his main character. However, the lack of depth is most likely due to his superficial understanding of the psyche of an "Indian girl who immigrated to the States."

Woman and her psyche have always been somewhat of a mystery to the opposite sex, as evidenced by Sigmund Freud's famous question, "Was will das Weib?" (What does woman want?). This mystery has been acknowledged by women as well as men. As a case in point, the 19th-century French scientist and "feminist" (the term was not yet invented) Clémence Royer, in a suppressed communication titled "Sur la natalité," told her colleagues at the Société d'Anthropologie, "to understand woman, it is necessary first not to be a man" [13]. And, a best-selling book by John Gray is titled *Men are from Mars, Women Are from Venus*.

Thus it is not surprising that the number of male authors who have successfully captured the female perspective is extremely small. The names of Henry James, whose reputation rested on his realistic depiction of "the American girl," D. H. Lawrence of *Lady Chatterly's Lover* fame, and James Joyce, whose *Ulysses* concludes with Molly Bloom's long affirmative soliloquy, are among the few on this list. Yet, apparently believing in Robert Browning's dictum, "A man's reach should exceed his grasp," Djerassi, a seasoned

scientist and entrepreneur but a relative newcomer to creative writing, deserves credit for daring to attempt this challenging feat.

In addition to characters from *Menachem's Seed*, persons from Djerassi's other earlier "science-in-fiction" novels reappear in this concluding volume, especially as members of SURYA's scientific and medical advisory boards: from *The Bourbaki Gambit,* Max Weiss, retired Princeton biochemist; and from *Cantor's Dilemma,* Nobel laureate Isidore Cantor; Jeremiah Stafford, Cantor's student and fellow Nobel laureate; Paula Curry, who marries Cantor; and Celestine Price, a Cal Tech researcher and Paula's niece. As usual in Djerassi's novels, there is a large cast of interesting characters and the occasional mention of real people, e.g., John Maddox, former editor of the international scientific journal *Nature*; Mother Teresa, who blesses SURYA's prospectus by autographing it; and Judge Marilyn Hall Patel, who is asked to rule in a lawsuit involving SURYA. And sitting on SURYA's board of directors is Alfredo Zaffanori, founder of ZALA laboratories and an authority on drug delivery systems—obviously a thinly disguised Alejandro Zaffaroni of ALZA laboratories. (The book is dedicated to George Rosenkranz and Zaffaroni, technical director and executive vice president, respectively of Syntex, with whom Djerassi was associated as research vice president and board member.) Djerassi even mentions himself twice—first, with his typical humor, in connection with the awarding of the first Wolf Prizes at the Knesset in Jerusalem (Renu, who witnessed the ceremony, writes Frankenthaler, "Chemistry had a single winner with a crazy spelling.... A good speaker, but a bit arrogant, I would say" [pp 13–14]) and second, in connection with his Stanford human biology course, "Feminist Perspectives on Birth Control" (pp 203–204).

In the concluding sentences of *NO* and hence of the tetralogy, Djerassi underscores one of his favorite themes with a conversation between Celestine Price and Renu:

> "Now that you're moving back to the lab? Do you lust?" [Celestine asks] ..."I suppose I do," Renu said. "I think Cantor was right: noble science usually goes with lusting for recognition; one of those gray aspects of science he spoke about. Why are you looking at me that way? Are you disappointed?" "Disappointed?" Celestine shook her head. "On the contrary. I'm relieved. Welcome to the tribe" (p 276).

In *Menachem's Seed*, Djerassi's characters, particularly the women such as Melanie Laidlaw, were fully developed characters about whom we grew to care and with whom we came to empathize. In *NO*, however, Renu, in a sense Djerassi's alter ego (like her, he was intimately involved in drug development and venture capitalism with CIBA in Summit, NJ and Syntex, S.A. in Mexico City.), seems to be a character more designed to serve his purpose of demonstrating that an immigrant Asian woman can succeed in a primarily male-dominated field than a fully developed real person. Yet, especially in his masterly treatment of the details of the scientific aspects of his "science-in-fiction" novels, which, after all, are their *raison d'être*, Djerassi writes with the authority of a longtime insider and participant. We are extremely pleased to observe the progress that Djerassi has made in his fiction writing.

Because the amount of basic science as well as research, development, and marketing in this novel is much more than in the previous three, the book may have more appeal to scientists, particularly those involved in industry and entrepreneurship, than to the general public. Nevertheless, since Djerassi continues to write about what he knows best, it is autobiographical and self-revealing. As in *Menachem's Seed*, in *NO* Djerassi speaks fully in his own distinctive voice.

In his now-completed tetralogy of "science-in-fiction" novels Djerassi has successfully depicted the human side of scientists and the personal conflicts that they face in their quest for scientific knowledge, personal recognition, and financial rewards as well as simultaneously describing with a high degree of accuracy some exciting current biomedical developments. Not content to rest on his laurels, however, he has embarked on a projected trilogy of stage plays to explore the even rarer genre of "science-in-theatre." The world premiere of Djerassi's first play in this genre, *ICSI: An Immaculate Misconception*, based on *Menachem's Seed*, produced and directed by William Archer, was held on August 6, 1998 at the Edinburgh Fringe Festival in Edinburgh, Scotland. A live video of an actual insertion of a single sperm into an egg is incorporated into the play, which

will run there through August 31, 1998. It is likely that it will subsequently open in London. Organon, the Dutch pharmaceutical company, is underwriting a performance of the Edinburgh production with the Edinburgh cast in San Francisco at the International Congress on Reproductive Medicine, where a symposium on ICSI will be held. Djerassi is currently working on the second play of the trilogy, *NO*, loosely based on some aspects of the novel under review here. For further details on Djerassi's "science-in-fiction" and "science-in-theatre" as well as excerpts from his novels, visit his web site: http://www.djerassi.com.

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