

Judith Merrill and Rachel Carson: Reflections on Their “Potent Fictions” of Science

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Abstract

Donna Haraway has argued that women’s engagement with the masculine domain of science and modern culture usually occurs at the peripheries and from the depths, not from the platform of the powerful. This paper considers the popular culture fields of science fiction and nature writing, exploring the contributions of two American women writers who both operated at the peripheries of science *and* landed on the ‘platform of the powerful’: Judith Merrill and Rachel Carson. Their domestic Cold War envisioning and conflation of literature and science and their insights into the inherently political nature of science anticipated the foundational feminist discussions on the intersections of feminism, literature, and science that followed in the 1970s and 1980s. Merrill’s postwar, literary avant-garde ideas together with the stories of the later American feminist science fiction writers prompted Haraway’s challenging suggestion in her transformative study, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (1989) that we might read natural science as a narrative--potent fictions of science--and listen to scientists as storytellers. Rachel Carson, considered the founder of the modern American environmental movement and the author of the famous polemic *Silent Spring* (1962), had advocated the idea of natural science as narrative decades earlier. The paper traces how Carson links to Merrill indirectly and Haraway to Merrill directly. In the Cold War decades, both Merrill and Carson struggled successfully from and within the margins of science to reshape literatures dealing with possible futures and alternative presents.

Key Words: science fiction, nature writing, Judith Merrill, Rachel Carson

Introduction

Women’s engagement with the masculine domain of science and modern culture usually occurs at the peripheries and from the depths, not from the platform of the powerful, suggests a leading feminist theorist and historian of science, Donna Haraway.¹ Historians and philosophers of women in science, such as Pnina Abir-am, Evelyn Fox-Keller, and Londa Schienbinger, have taken a long look at women in the past who actually ‘do’ science. My interest here, however, is in developing a political reading of women science writers’ engagement with science at the peripheries of scientific thought and developments in a ‘pre-feminist’ era: the decades after the Second World War. I consider the popular culture fields of science fiction and nature writing, adjusting the focus on two American women science writers who both operated at the peripheries of science *and* landed on the ‘platform of the powerful’: Judith Merrill and Rachel Carson. Their domestic Cold War envisioning and conflation of literature and science and their insights into the inherently political nature of science anticipated the foundational feminist discussions on the intersections of feminism, literature, and science that followed in the 1970s and 1980s. Indeed, Haraway’s own revolutionary studies of the historical, social construction of Western scientific knowledge discovered, borrowed, and adapted science fictional approaches and incorporated Merrill’s imaginative concept, ‘SF.’

Judith Merrill (1928–1997) in her Cold War science fiction and nonfiction writings effectively challenged the prevailing science-adventure (‘hard’) mode of science fiction and promoted novel approaches to fiction about possible futures that struggled to put a human face on the abstract problems of new, seductive and terrifying, sciences and technologies. In her words, ‘the industrial, political, and technological space age meant the beginning of a new period of

exploration in “the human factor,” as opposed to the “hardware,” for both science and science fiction.’² Her novels and short works of speculative fiction of the late 1940s and the 1950s advanced an overtly woman’s point of view on critical issues of the day. By the early 1960s, even before the blossoming of feminist science fiction, Merrill had become the foremost female editor-critic and experimentalist, and perhaps most political individual in North American science fiction circles. Merrill’s work links her intriguingly to the contemporary and celebrated Rachel Carson (1907–1964). Carson excelled in the 1950s in developing the human factor in natural science literature. Prior to her most influential book, the anti-pesticide polemic *Silent Spring* (1962), Carson was a prize-winning science writer – early in her career also a government marine biologist and (mostly) editor and writer on wildlife.³ *Silent Spring*’s apocalyptic vision of a world destroyed by its own citizens resonated with the radical science fiction writings of the day. Significant commonalities appear in the iconoclastic approach of these two women to science writing in the postwar era, each a leader in her respective field.

Merril’s SF: Fiction That Seeks the Meaning in Science and Our Scientific Society

Modern science fiction, which emerged in the American pulp magazines (small format, garish serials printed on cheap paper) in the 1920s, developed as a grouping of story types.⁴ The hybridization and eclecticism in science fiction during the early domestic Cold War occurred over two short phases. In the most intense political phase, new writers entered science fiction in the late 1940s and early 1950s. Then new forms of science fiction writing, new mass-publishing venues, and critics and a second round of new writers emerged at the end of the 1950s and the early 1960s. Both phases in the evolution of science fiction correspond to what Paul Boyer in *By the Bomb’s Early Light* identifies as the first two phases in a series of Cold War public activism events around atomic war and radioactivity issues.⁵ Both phases also attracted many women to the field.⁶ For the women in early postwar science fiction such as Judith Merrill, the various phases and waves also overlapped with the so-called break between the first and second waves of the women’s movement.

Merril’s recently published memoir, *Better to Have Loved: The Life of Judith Merrill* (2002), highlights her original goal in science fiction in the late 1940s. It was to write a type of sociological science fiction that grappled with the new political and social issues of the domestic Cold War and the Space Age.⁷ This stated objective is consistent with the archival evidence she left behind. In *American Science Fiction and the Cold War* (1999), David Seed makes Merrill’s first novel *Shadow on the Hearth* (1950) central to his discussion of the suburban home as a refuge. He pushes this idea further in a more recent paper, ‘The Debate Over Nuclear Refuge’ (2002) by showing how *Shadow on the Hearth* connects to the contemporary work of scientists such John Hersey (*Hiroshima*), David Bradley (*No Place to Hide*), and Philip Morrison (‘If the Bomb Gets Out of Hand,’ in Dexter Masters and Katherine Way, eds., *One World or None*) in an original way. Unlike male writers, ‘Merril has no interest in trying to capture the spectacle of the blasts, only in exploring their consequences for a typical suburban household.’⁸ Merrill’s correspondence with Bradley in 1949 reveals her purpose in departing from the norm; she wanted to appeal to women readers: ‘Women LOVE to read about diseases [...] and also about dangers to their children, homes, and family,’ she writes. Merrill adds that Bradley’s *No Place to Hide* was in truth ‘a man’s book, with little appeal for women.’⁹

Merril likewise intended her first published story, ‘That Only a Mother,’ (1948), about the differential reactions of parents to their limbless, super-intelligent infant, as a ‘women’s point of view.’ She writes, ‘It was an extremely unpleasant story about the possible (probable?) effects on one small ordinary family of life during a comparably ‘clean’ controlled atomic war in (what was then) the near future [...] the more insidious after effects—the cancers and leukemias that might

follow years later for apparently untouched survivors; the lingering radioactivity; the sterility and mutations [...].¹⁰ Merrill possibly intended the central figure of the story, the mother who refused to acknowledge her baby's deformities, to represent the scientists in post-Hiroshima America who refused to acknowledge the devastating effects of atomic radiation.¹¹

Reception for Merrill's relatively modest corpus of science fiction novels and short fiction works, all of it produced between 1948 and 1963, has always been mixed. In its day, her early fiction received critical attention, though a leading critic and colleague, Damon Knight, dismissed her later fiction as sentimental, romantic, and, in the extreme view, 'sweat-and-tears-and-baby-urine variety,' 'kitchen-sink' science fiction.¹² Merrill's fiction did not fare better at the hands of the 1970s wave of feminist science fiction writers and scholars. They tended to trivialize Merrill's work, along with that of most of the early women science fiction writers, one way or another.¹³ Most of the early women writers worked within masculinist paradigms. Merrill, on the other hand, eschewed masculinist conventions and placed family relationships at the centre of her stories. In different ways, each of these strategies is unsatisfying to many feminists: the former reifies masculinist generic conventions; the latter reifies the narrow identification of the female writer with domestic themes.

Feminist opinion on the significance of women's early science fiction stories has continued to bounce around. In the 1990 *Encyclopedia of Science Fiction*, American-born British science fiction critic-writer Lisa Tuttle classified (and dismissed) Merrill among those early women writers in science fiction whose female protagonists are too conventional. Yet the trend is changing. A new generation of feminist science fiction writers and critics are re-evaluating not only the role of the early women writers, especially Merrill, but also the role of 1970s feminist science fiction writers in the erasure of those women from the memory of the feminist project. Both Connie Willis, as an American critic-writer of science fiction, and Helen Merrick, as an Australian science fiction scholar, for example, blame the first generation feminist writers such as Russ for creating an invisible wall, as it were, around the laudable activism of pre-feminist science fiction writers such as Judith Merrill¹⁴

Regardless of the relative merits of Merrill's science fiction, whether her dark post-nuclear holocaust fiction stories or her optimistic stories on the colonization of space that followed, her criticism and editorial work proved to be Merrill's major preoccupation and source of posterity and political influence. Merrill's nonfiction writing, especially her annual anthologies and critical reviews of science fiction and science fact, received overwhelming respect in their day. Her male contemporaries (whatever they thought of her fiction writing) referred to Merrill as a science fiction connoisseur. It was Merrill's nonfiction writings on science fiction, not her science fiction stories *per se*, that would catch the eye of Donna Haraway several decades later. Thus, intrinsically and for their influence on Haraway, Merrill's nonfiction writings warrant further discussion here.

From the early 1950s onward, Merrill took every occasion in her role as anthologist, critic, and editor in book and magazine publishing to revolutionize science fiction as a powerful, creative, potentially radical genre. It is what she (and, later, because of her, Haraway) referred to in capitalized initials as 'SF.' Merrill first set the standard for SF both in her own fiction writing and in her fantasy/science fiction theme anthologies published before 1955. She then formulated arguments about SF in the second half of the 1950s, when she launched and edited what would prove to be a popular major annual anthology of previously published science fiction stories, *SF: The Year's Best*. Merrill's *Year's Best* for 1959, in particular, promoted her idiosyncratic and entertaining--but with an underlining seriousness, in the manner of all good science fiction--explanation of SF. Merrill writes:

SF is an abbreviation for Science Fiction (or Science Fantasy). Science Fantasy (or Science Fiction) is really an abbreviation too. Here are *some* of the things it stands for... *S* is for Science, Space, Satellites, Starships, and Solar exploring; also for Semantics and Sociology, Satire, Spoofing, Suspense, and good old Serendipity. (But *not* Spelling, without which I could have added Psychology, Civilizations, and *Psi* without parentheses.)

F is for Fantasy, Fiction and Fable, Folklore, Fairy-tale and Farce; also for Fission and Fusion; for Firmament, Fireball, Future and Forecast; for Fate and Free-will; Figuring; Fact-seeking, and Fancy-free.

Mix well. The result is *SF*, or *Speculative Fun...*

Happy reading.¹⁵

Merril's passion for exploring the creative and critical promise of the genre found its greatest expression in the mid-1960s British-based new wave of 'soft' science fiction using modern styles of writing. After spending a year with London-based new wave writers and publishers in the mid-1960s, she became the North American promoter and defender of the small but controversial approach. She produced a seminal essay in 1966 about the superiority of SF ('experimental,' 'daring') over mainstream science fiction ('s-f') for the first journal of science fiction criticism, *Extrapolation*; the piece gained a second life when later anthologized in Thomas Clareson's seminal collection on science fiction criticism, *SF: The Other Side of Realism* (1971).¹⁶ By this historical juncture of new wave science fiction and the gathering second wave of the women's movement at the end of the 1960s, the feminist science fiction of Joanna Russ, in particular, Ursula K. LeGuin, and a handful of other new women in science fiction literature gained notice in the field.

Although not engaged in feminist politics *per se*, Merrill understood both the politics of mythologizing and the unique role of science fiction, reconfigured as 'SF,' as modern myth. In her 1967 science fiction annual anthology, *SF: Best of the Best*, she appears to struggle with the evolving issue of the nature of science fiction literature – with its ever widening inclusiveness (hence, what to name it), the science in science fiction, and, especially, with the role of science fiction as modern myth:

More recently there has been much talk (from me among others) about SF as modern myth. It may seem pretentious to speak of a field which degenerates so readily into mere adventure story as the replacement for classical philosophy in our time – and yet this is to some extent the role s-f has been playing. Science-fiction is not fiction about science, but fiction which endeavors to find the meaning in science and in the scientific-technological society we are constructing.¹⁷

Finding the meaning in science and the scientific society under construction encapsulates Merrill's radical vision of the critical role for science fiction at the end of the sixties.

Merril understood – and tirelessly promoted – the subversive nature of the genre: 'I do not mean just in its special uses as a vehicle of political analysis and social criticism,' she cautioned, 'but in its essential character. A literature dealing in possible-futures and alternative-presents, concerned with how things *might be*, rather than how they are, is inevitably (in any state short of Utopia) going to stir up some degree of dissatisfaction with the world-as-it-is. And just as certainly it will attract writers with vigorous opinions about how things *ought* to be.'¹⁸

Merril had for her part launched and nurtured the move away from the traditional male model of 'hard' science fiction, with its concern with getting the science right. The science

fiction envisionings of alternative futures by Merrill and her circle were, according to Boyer, everywhere 'in the air' by the late 1950s. To live in the modern world was to know science fiction ideas and icons firsthand, a point not lost on Rachel Carson when writing *Silent Spring*.

Rachel Carson: The social obligation of nature writing

Rachel Carson had no formal connection to Merrill, was likely not a fan of science fiction, and did not live to see feminist critiques of science. Yet, she recognized the persuasive power of the science fiction form in telling an apocalyptic story about science. Like Merrill she was a daring, experimental writer of the postwar era, and her influence over the public debate about science and society has been international in scope and enduring. Like Merrill, she, too, endeavored from the margins to find the social meaning in science.

Carson always promoted the importance of a story-telling quality in nature writing. She once even claimed that in college her ambition to be a writer barely lost out to her passion for natural history.¹⁹ She was also proud of the literary content of her science writings. She always credited the literary merit of her work for her ability to reach a large, popular audience of non-specialists with her science stories of the natural world. She was already an innovative, national best-selling author in the natural sciences well before the appearance of *Silent Spring*.²⁰ By the early 1950s, she had won major awards and honorary doctorates in both literature and science, and membership in the American Academy of Arts and Letters, which was unusual for a woman, let alone a scientist. Hers was a remarkable, pre-feminist success in lowering the barriers, not just between women and science, but likewise between science and literature.

Carson's attention to literary matters, to poetics and emotion, to fostering a sense of wonder in her science writing represented a political choice, political in the sense of challenging established ideas about her field. Ceremonies for Carson's prestigious book award and the political and policy upheavals in her own government service in the early 1950s provided her with opportunities to speak her mind as an advocate for the natural world and – much as Merrill had – to speculate about *possible* futures. Carson's recent biographer, Linda Lear, notes that Carson used the occasion of accepting the National Book Award for Nonfiction in 1952 to comment on her concern with the trend toward the 'artificial separation of science and literature as exclusive methods of investigating the world.'²¹ For Carson, 'the aim of science is to discover and illuminate the truth,' which was for her the objective of all literature.²² Carson's conclusion that 'there can be no separate literature of science' was both unusual for the times and a harbinger for the feminist debates about science to come.

Carson continued the theme when accepting the John Burroughs Medal for excellence in nature writing the same year. On that occasion she argued that natural science writing as public education was an urgent need if Americans were to prevent the type of human isolation in increasingly artificial, 'man-made' worlds, isolation that fostered what she chillingly described as 'experiments for the destruction of himself and his world.'²³ She underscored her message about the social obligation of nature writing in the atomic age: 'If we have ever regarded our interest in natural history as an escape from the realities of our modern world, let us now reverse this attitude. For the mysteries of living things, and the birth and death of continents and seas, are among its great realities.'²⁴

Carson's anti-pesticide study, *Silent Spring*, reflects the hand of the same thoughtful, inventive writer and visionary. It also demonstrates her continuing resistance to the idea of a separate literature of science. Nevertheless, it is much bolder and experimental than her earlier writings. Lear argues that its polemical nature was a major departure from Carson's earlier writing, because in it 'Carson [...] attacked the integrity of the scientific establishment, its

moral leadership, and its direction of society. She exposed their self-interest as well as their poor science and defended the public's right to know the truth.²⁵ Carson had wanted the book to make a difference, and, as is well known, it did. *Silent Spring* launched the modern environmental movement,²⁶ has been compared with Charles Darwin's *On the Origin of Species* for the scope of its challenge to the dominant scientific paradigm, and it remains one of the most important American books of the twentieth century.²⁷

Carson arrived at this departure from her usual nature writing by grounding her radical analysis of the dangers posed by the indiscriminate use of synthetic pesticides in a difficult maze of obscure scientific studies and investigative journalism. Her wartime role as an 'information specialist' and a government editor and writer of fish and wildlife research publications had already exposed her to early classified government science on the dangers to wildlife and human health of the DDT pesticide range. Her former editorial role in government, which might seem on the surface to have been an inferior position, given her training as a marine biologist, proved a tremendous asset after she left government service in the early 1950s for a career as an independent scholar-writer. It gave her the access to the classified core research and to the researchers she needed for her controversial new study that her free-lance position might have prevented.

The writing of *Silent Spring* from 1957 to its publication in 1962 would also draw Carson into a dynamic shifting network of concerned, tenacious, and unusually influential women on the margins of science in the United States, Canada, and Britain. These women both prompted and advocated Carson's study. The book project was thus Carson's entrée into an expanding world of women activists in North America and Europe, though she would die of breast cancer in 1964 before she had a chance to enter fully into that powerful arena. Several of these women are identified by Linda Lear in her writings on Carson, as well as by Carson herself. She writes in *Silent Spring* of the influential appeals of her friend Olga Huckins, whose private bird sanctuary was poisoned by pesticides in the 1950s in an aerial spraying campaign for mosquito control. The early stages of Carson's research for the book and the articles and letters she published at the time drew the attention of *Washington Post* newspaper owner Agnes Meyer, and activist Christine Stevens, who was president of the Animal Welfare Institute of New York. Stevens recognized the value of Carson's special qualities as a nature writer for environmental causes, writing to Carson: 'All humanitarians will be grateful to you for writing on this subject, for your great gift as a writer combined with those of a biologist would make your efforts of inestimable value in putting a stop to these poison campaigns.'²⁸ She introduced Carson to the work of British environmental activist Ruth Harrison, whose exposé of the inhuman treatment of livestock when published in 1963 would carry a preface written by Carson.²⁹

Carson constructed this extraordinary book in the second wave of nuclear awareness and concern, which Boyer suggests now 'surfaced at all cultural levels.'³⁰ Examining the impact of the bomb on Carson's anti-pesticide narrative, Ralph Lutts concludes that Carson most certainly counted on that public awareness and fear of radioactive contamination in constructing the story line of the book.³¹ Carson used the popular narratives of the day (fear of nuclear war and radiation sickness, invisible killers, hidden persuaders), drawing parallels between the effects of atomic radiation and those of chemical pesticides, and the persuasive power of mass advertising. All of them were major topics in mass-marketed science fiction, thanks to the radical Cold War science fiction writers such as Judith Merril.

Finally, in her attention to the literary quality of her science writing, Carson also employed science/speculative fiction-like conventions and ideas that were 'in the air' – although there is no evidence to support the idea that she did so intentionally. On the contrary,

fragmentary evidence exists to suggest that Carson was not familiar with science fiction literature and not even interested in getting to know it.³² Yet, like her postwar contemporaries in science fiction, she would have understood the appeal of images of the ‘near future.’ In science fiction practice, the near future setting is a world ‘imminently real’ (it could be tomorrow), in which people may someday live and must imaginatively prepare for in advance.³³ Taken as a whole, Carson’s literary choices were unorthodox for a natural science writer.³⁴ They were also courageous choices. Some critics of the day disparaged *Silent Spring* as an entire work of science fiction (referring to the low regard in which science fiction was held, possibly even by Carson). Many of them scoffed at Carson’s myth-like reputation as a goddess of nature (referring to the environmental and animal rights activists with whom she associated), called her emotional and extremist, questioned her integrity, sanity, and loyalty to the nation, even branded the 55-year old Carson a ‘spinster,’³⁵ the ultimate heavy-handed insult leveled against women who stepped of bounds.³⁶

No aspect of *Silent Spring* is more ‘potent’ than the prologue. Carson chose to write it as a fable, ‘A Fable for Tomorrow.’ The growing scholarship exploring the public response to *Silent Spring* is mindful of the contemporary appeal of Carson’s apocalyptic vision and of the special role of the fable prologue in cementing that vision.³⁷ The near-future images in Carson’s fable prologue are meant to appeal to a reader’s creative imagination to end the destructive impulse that marked the reality of the postwar era, a reality about which she had been issuing gentle public warnings since at least 1952. The narrator of the book’s science-fiction-like prologue imagines a silent springtime in a world destroyed by its own citizens through the indiscriminate use of pesticides. Reverting to her own authorial voice in a final paragraph, Carson confides in readers that it is not too late for America to prevent the story in the fable. However, she wrote, ‘a grim specter has crept upon us almost unnoticed, and this imagined tragedy [described in the fable] may easily become a stark reality we all shall know. What has already silenced the voices of spring in countless towns in America?’³⁸ The answer to Carson’s powerful science-fiction-like question is the subject of the entire book.³⁹ The reader is hooked. What a science storyteller, in Haraway’s positive sense of the term. And what a science story.

Haraway’s potent fictions of science

Although Donna Haraway’s 1980s historical analysis of natural history writing makes no reference to Carson, it could just as easily have included her. One of the large questions in Haraway’s rather extraordinary study, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (1989) was already on Carson’s mind in the 1950s: ‘What may count as nature for late industrial people?’ Merrill is a different story. Haraway acknowledges Merrill’s critical writings directly and, to an extent, indirectly via feminist science fiction stories of the 1970s, with their tenuous connections to Merrill’s advocacy of experimental science fiction. These feminist science fiction stories also inspired Haraway’s revisioning of science as a story-telling practice.

It is usual in science fiction to think of the late 1960s with the publications of Joanna Russ and Ursula K. LeGuin as the rough starting point of a noticeable influence, not merely a presence, of women writers and women’s issues on science fiction. Then, the generation of American feminist science fiction writers who penetrated the field in the 1970s – ‘informed,’ as the American literary critic Sarah Lefanu writes, ‘by the feminist, socialist and radical politics’ of the day – embraced the radical and quite different political possibilities and limits of science fiction to advance feminist agendas concerning the impact of reproductive and other new technologies.⁴⁰

The key American feminist science fiction writer and critic, Russ, argued as early as 1971, but a decade after Merril, that science fiction was a natural trail for any kind of radical thought and for presenting the concerns of a marginal group. She suggested that for her contemporaries in America, where female culture was present but still marginalized, men and women continued to view culture from a single point of view: that of the male. The literary myths were male myths.⁴¹ Thus, science fiction was revolutionary in the 1970s because it offered feminist writers a chance to create alternate myths and metaphors. Science fiction was one of only a handful of genres to employ plots that transcended accepted gender roles and transcended culture, and, as she points out, went where some of the most 'fascinating characters' were not necessarily human.⁴² For Russ, writing science fiction and criticism in the full bloom of the new feminism,

Science fiction, political fiction, parable, allegory, exemplum--all carry a heavier intellectual freight (and self-consciously so) than we are used to. All are didactic. All imply that human problems are collective, as well as individual, and take these problems to be spiritual, social, perceptive, or cognitive [...]. I would go even farther and say that science fiction, political fiction (when successful), and the modes (if not the content) of much medieval fiction all provide myths for this dealing with the kinds of experiences we are actually having now, instead of the literary myths we have inherited, which only tell us about the kinds of experiences we think we ought to be having.⁴³

Marilyn Hacker in her introduction to Russ's writings in 1977 would observe that, thanks to Russ, feminist mainstream fiction writers had discovered the radical possibilities of science fiction: '[some of the] most imaginative, artistically successful, and convincing feminist fiction writers are discovering/borrowing/adapting speculative-fictional conventions and techniques.'⁴⁴

The myth-making and myth-breaking possibilities of feminist science fiction that Russ and her circle advanced in the early 1970s influenced the critical thinking about science and feminist epistemology of the leading feminist thinkers who followed. Sandra Harding in *The Science Question in Feminism* (1986), for example, has famously traced the trajectory of feminist approaches to the philosophy of science and theories of knowledge from the mid-1970s reformist position (the 'woman question' in science), to the 1980s revolutionary position (the 'science question' in feminism). In other words, illuminating the shift from a concern for the situation of women in science to a radically different question: 'Is it possible to use for emancipatory ends sciences that are apparently so intimately involved in Western, bourgeois, and masculinist projects?'⁴⁵ Echoing Russ's and Hacker's earlier discussions indirectly, and Haraway's acclaimed essay, 'A Manifesto for Cyborgs' (1985), more directly, Harding refers to women's science fiction writings at one point in her epistemological text, offering the poignant suggestion for a feminist understanding of science: 'Perhaps we should turn to our novelists and poets for a better intuitive grasp of the theory we need.'⁴⁶ The science fiction novelists Harding turns to are Marge Piercy, *Woman on the Edge of Time* (1976), and Anne McCaffrey, *The Ship Who Sang* (1969), and she asks:

What kind of understanding of science would we have if we began not with the categories we now use to grasp its inequities, misuses, falsities, and obscurities but with those of the biologist protagonist imagined by Marge Piercy in *Woman on the Edge of Time*, who can shift her/his sex at will and who lives in a culture that does not institutionalize (i.e. does

not have) gender? or with the assumptions of a world where such categories as machine, human, and animal are no longer either distinct or of cultural interest, as in Anne McCaffrey's *The Ship Who Sang*?⁴⁷

Piercy's wildly popular *Woman on the Edge of Time* (1976) continues down to this day to be the outstanding example of what Hacker alerted us to: a 1970s feminist mainstream fiction writer's experimentation with the science fiction genre.

As Harding discovered, Haraway was interested in what she refers to as 'the narratives of scientific fact – those *potent fictions of science* – within a complex field indicated by the signifier SF.' Judith Merrill was her inspiration to do so. Here is how Haraway in *Primate Visions* explains it: 'In the late 1960s science fiction anthologist and critic Judith Merrill idiosyncratically began using the signifier SF to designate a complex emerging narrative field in which the boundaries between science fiction (conventionally, sf) and fantasy became highly permeable in confusing ways, commercially and linguistically. Her designation, SF, came to be widely adopted as critics, readers, writers, fans, and publishers struggled to comprehend an increasingly heterodox array of writing, reading, science fiction, science fantasy, speculative futures, speculative fabulation.'⁴⁸ Science fiction stories and Merrill's imaginative concept, 'SF,' prompted Haraway's challenging suggestion that we might read scientific practice as essential story-telling practice and listen to scientists as essential storytellers. It was a path down which Rachel Carson had boldly advanced, though not actually interrogated, decades previously.

To begin to do justice to Haraway's thoughtful, linguistically complex, myth-exploding analysis of research into monkeys and apes in *Primate Vision* requires close attention to the central reasoning of her massive study:

From only a slightly different perspective, the history of science appears as a narrative about the history of technical and social means to produce the facts. The facts themselves are types of stories, of testimony to experience. But the provocation of experience requires an elaborate technology – including physical tools, an accessible tradition of interpretation, and specific social relations. Not just anything can emerge as a fact; not just anything can be seen or done, and so told. Scientific practice may be considered a kind of story-telling practice – a rule-governed, constrained, historically changing craft of narrating the history of nature. Scientific practice and scientific theories produce and are imbedded in kinds of stories. Any scientific statement about the world depends intimately upon language, upon metaphor. [...] Science practice is above all a story-telling practice in the sense of historically specific practices of interpretation and testimony.⁴⁹

Haraway places her accounts of primatology within SF as 'an invitation for readers of *Primate Visions* to remap the borderlands between nature and culture.' She invites them (us) to behave like readers of science fiction and rewrite the text through the act of reading.⁵⁰ The concluding chapter of *Primate Visions*, 'Reprise: Science Fiction, Fictions in Science, and Primatology,' looks at how Joanna Russ, Marge Piercy, and several other female and male science fiction writers have 'provided one of the lenses for reading primatological texts.'⁵¹ In the chapter's explosive final subsection, 'Reading Science Fiction as Primatology: Xenogenesis and Feminism,' Haraway examines, or as she puts it, 'perversely reads,' volume one of Octavia Butler's *Xenogenesis* Trilogy, the science/speculative fiction story entitled *Dawn: Xenogenesis* (1987), as though it were a monograph from the modern primate field.⁵²

Haraway's debt to Judith Merrill's 1960s experimental ideas about science fiction is significant – and novel – for a feminist scientist and historian of science. For one thing, with few exceptions the political critique and literary avant-garde ideas inherent in Merrill's nonfiction writing went largely unnoticed until Haraway's discovery of them in the late 1980s. For another, Haraway's argument that 'placing the narratives of scientific fact within the heterogeneous space of SF produces a transformed field,' initiated Haraway's own extraordinary transformation of the fields of the history of science, cultural criticism, and feminist theory in the 1990s.

Conclusion

It is not difficult, though it is unusual, to speak of Judith Merrill, Rachel Carson, and the later feminist science fiction writers and feminist philosophers and historians of science all in the same breath. For several decades before the establishment of feminist science fiction and feminist science studies, Merrill and Carson had independently written about many of the 'subversive' science-nature and science-literature issues that feminists of the 1970s and 1980s subsequently addressed. In this respect, the great feminist writers on science fiction and science fact of the 1970s and 1980s did not represent a permanent break from the past. Domestic Cold War anxieties and the expansion of mass marketing in publishing provided Merrill and Carson with openings to take science fiction and popular science writing, respectively and collectively, in experimental and politicized directions. These new directions displayed great imaginative power and demonstrated the potential for radicalism in their respective fields. Each in their own way struggled from and within the margins of science to reshape literatures, both fiction and nonfiction, dealing in possible futures and alternative presents. By the end of the 1960s both figures had left the scene. Carson died shortly after the publication of *Silent Spring*. Merrill immigrated to Canada in 1968 over American military involvement in Vietnam. In so doing, she knowingly also relinquished her position of power and influence in the all-important American science fiction field. It would be left to future generations of feminist writers to 'find' the feminist meanings in science. In the greatly altered international political climate of the 1970s and 1980s, feminists such as Russ, Harding, and Haraway connected with a tradition of which Merrill and Carson, taken across the broad spectrum, were formidable architects. The cumulative impact of these post-war female interventions from the margins into the nature, culture, and the social construction of science over the past five decades continues to shape and reshape Western visions about humans, machines, and nature – and the essential relations among them.

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² Judith Merrill, ed., *SF: The Best of the Best* (New York: Dell, 1967), p. 5.

³ See also my discussion of Merrill and Carson in the context of the atomic bomb: Dianne Newell, 'Women Writing Natural Science and Science Fiction in an Age of Anxiety: Atomic Reading,' paper presented at the 5th Interdisciplinary and International Symposium on Gender Research: 'The Nature of Gender. The Gender of Nature.' Christian-Albrechts-Universität zu Kiel, Germany, 10–12 November 2000.

⁴ Everett F. Bleiler, 'Introduction,' in Bleiler, ed., *Science Fiction Writers: Critical Studies of the Major Authors from the Early Nineteenth Century to the Present Day* (New York: Charles Scribner's Sons, 1982), pp. xi–xv.

⁵ Paul Boyer, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Nuclear Age*. First published in 1985 (New York: Pantheon, 2nd ed., 1994), new preface.

⁶ Pamela Sargent was the first to reflect on the history of women science-fiction writers. Pamela Sargent, ed., *Women of Wonder. Science Fiction Stories by Women about Women* (New York: Random House, 1975), editor's introduction, pp. xiii–lxiv. See also Sargent, ed., *Women of Wonder: The Classic Years. Science Fiction by Women from the 1940s to the 1970s* (New York: Harvest Original, 1995), editor's introduction, pp. 1–20.

⁷ Judith Merrill and Emily Pohl-Weary, *Better to Have Loved: The Life of Judith Merrill* (Toronto: Between the Lines, 2002); see also Brian Stableford, 'Judith Merrill,' in John Clute and Peter Nicholls, eds., *The Encyclopedia of Science Fiction* (London: Orbit Press, Little, Brown and Co., 1990; 1999), p. 799.

⁸ David Seed, *American Science Fiction and the Cold War: Literature and Film* (Chicago: Fitzroy Dearborn Publishers, 1999); Seed, 'The Debate Over Nuclear Refuge,' p. 15, unpublished essay cited with author's permission.

⁹ Seed, 'The Debate Over Nuclear Refuge,' citing Judith Merrill Papers, National Archives of Canada, Ottawa, Merrill to John Bradley, 19 February 1949. See also Seed's interview with Merrill conducted only months before her death: David Seed, 'One of Postwar SF's Formative Figures,' *Interzone* 126 (Dec. 1997), pp. 13–14, 26; see also Allan Weiss, 'Not Only a Mother: An Interview With Judith Merrill,' *Sol Rising* [Toronto] 18 (April 1997):1, 6–9.

¹⁰ Judith Merrill, 'That Only a Mother,' *Astounding Science Fiction* (June 1948), and anthologized in over a dozen different collections and in four languages, including most recently Sargent, ed., *Women of Wonder: The Classic Years*, pp. 65–73. Quote taken from Merrill, 'Prologue,' in Merrill, *Survival Ship and Other Stories* (Toronto: Kakabeka, 1973), p. 5.

¹¹ Personal communication with Elizabeth Hull, Chicago, 2 March 2003. Professor Hull tells me that she shared this interpretation with Merrill in the 1970s, and that Merrill found it 'interesting.'

¹² Damon Knight, *In Search of Wonder: Essays on Modern Science Fiction* (Chicago IL: Advent, 1956), p. 100; and see also Chris Morgan, 'Judith Merrill,' in: Bleiler, ed., *Science Fiction Writers*, pp. 433–439.

¹³ See for example, Victoria Lamont and Dianne Newell, 'House Opera: Frontier Mythology and Subversion of Domestic Discourse in Mid-Twentieth Century Women's Space Opera,' *Foundation: International Review of Science Fiction*, Vol. 33 (2004): forthcoming.

¹⁴ Pamela Sargent, 'Introduction: Women and Science Fiction,' in Sargent, ed., *Women of Wonder* (1975), xiii–lxiv; Lisa Tuttle, 'Women SF Writers,' in Clute and Nicholls, eds., *The Encyclopedia of Science Fiction*, p. 1344; Connie Willis, 'The Women SF Doesn't See,' *Asimov's SF Magazine* 16, no. 11 (Oct. 1992): 4–8, 49; Helen Merrick, 'Fantastic Dialogues: Critical Stories about Feminism and Science Fiction,' in Andy Sawyer and David Seed, eds., *Speaking Science Fiction: Dialogue and Interpretation* (Liverpool: University of Liverpool Press, 2000), pp. 52–68.

¹⁵ Judith Merrill, 'Introduction,' in Merrill, ed., *SF: '59. The Year's Greatest Science-Fiction and Fantasy*. 4th Annual Volume (Hicksville N.Y.: Gnome Press, 1959), p. 10.

¹⁶ Judith Merrill, 'What Do You Mean: Science? Fiction?' *Extrapolation: Journal of Science Fiction and Fantasy Studies* 7 (May 1966): 30–46, and 8 (Dec. 1966): 2–19. Reprinted in Thomas D. Clareson, ed., *The Other Side of Realism. Essays on Modern Fantasy and Science Fiction* (Bowling Green OH: Bowling Green University Press, 1971), pp. 53–95.

¹⁷ Merrill, *SF: The Best of the Best*, p. 3.

¹⁸ Judith Merrill, 'Introduction,' in *Path into the Unknown. The Best of Soviet Science Fiction* (New York: Dell, 1968), pp. 7–11 (here pp. 7–8).

¹⁹ Frank Graham, Jr., *Since Silent Spring* (London: Hamish Hamilton, 1970), p. 5; Rachel Carson, 'The Real World Around Us,' in Carson, *Lost Woods: The Discovered Writing of Rachel Carson*, edited and with an introduction by Linda Lear (Boston: Beacon, 1998), pp. 148–163 (here p. 148).

²⁰ For a bibliography of her published work, see Paul Brooks, *The House of Life: Rachel Carson at Work* (Boston: Houghton Mifflin, 1972), and Linda Lear, *Rachel Carson: Witness for Nature* (New York, NY: Henry Holt & Co., 1997).

²¹ Lear, editor's introductory notes to Rachel Carson, 'Remarks at the Acceptance of the National Book Award for Nonfiction [for *The Sea Around Us*],' in Carson, *Lost Woods*, p. 90.

²² Carson, 'Remarks at the Acceptance of the National Book Award for Nonfiction,' p. 91.

²³ Rachel Carson, 'Design for Nature Writing,' in Carson, *Lost Woods*, p. 94.

²⁴ Carson, 'Design for Nature Writing,' p. 96.

²⁵ Linda Lear, 'Introduction' to part four, in Carson, *Lost Woods*, p. 187.

²⁶ See, for example, H. Patricia Hynes, 'Ellen Swallow, Lois Gibbs, and Rachel Carson: Catalysts of the American Environmental Movement,' *Women's International Forum* 8 (1985): 291-298; Carolyn Merchant, *Earthcare: Women and the Environment* (New York: Routledge University Press, 1995); Mary Joy Broton, *Women Pioneers for the Environment* (Boston: Northeastern University Press, 1998).

²⁷ See Linda Lear, 'Bombshell in Beltsville: The USDA and the Challenge of Silent Spring,' *Agricultural History* 66, no. 2 (spring 1992): 151-170, and Brooks, *The House of Life*.

²⁸ Lear, *Rachel Carson*, p. 346.

²⁹ Rachel Carson, *Silent Spring* (New York: Houghton Mifflin, 1962), p. 9. Lear, editor's introductory notes to Rachel Carson, 'Vanishing Americans,' a letter on the impact of widespread use of poisons on bird populations, in Carson, *Lost Woods*, p. 189; Lear, editor's introductory notes to Rachel Carson, 'To Understand Biology/Preface to *Animal Machines* [1963],' in Carson, *Lost Woods*, 192–93. See also Vera Norwood, 'Nature's Advocates: Rachel Carson and Her Colleagues,' in Norwood, *Made From this Earth: American Women and Nature* (Chapel Hill, NC: University of North Carolina Press, 1993), chapter 5.

³⁰ Paul Boyer, 'Epilogue: From the H-Bomb to Star Wars: The Continuing Cycles of Activism and Apathy,' in Boyer, *By the Bomb's Early Light*, p. 353.

³¹ Ralph H. Lutts, 'Chemical Fallout: Rachel Carson's *Silent Spring*, Radioactive Fallout and the Environmental Movement,' *Environmental Review* 9 (Fall 1985): 214–15, cited in Lear, *Rachel Carson*, pp. 560–561, n. 40.

³² I am grateful to Linda Lear for suggesting that I clarify this point, and for sharing with me her expertise on the important topic of Carson's reading habits. See M. Jimmie Killingsworth and Jacqueline S. Palmer, 'Silent Spring and Science Fiction,' in Craig Waddell, ed., *And No Birds Sing* (Carbondale and Edwardsville IL: Southern Illinois Press, 2000), p. 175 and n. 1, p. 201. My thanks to Linda Lear, who drew this recent anthology to my attention.

³³ Brian Stableford, 'Near Future,' in Clute and Nicholls, eds., *Encyclopedia of Science Fiction*, p. 856.

³⁴ Carol B. Gartner, 'When Science Writing Becomes Literary Art: The Success of *Silent Spring*,' in Waddell, ed., *And No Birds Sing*, pp. 103–125.

³⁵ See Graham, *Since Silent Spring*.

³⁶ For a recent thorough discussion of the contemporary attacks on *Silent Spring* and its author, see Michael B. Smith, "'Silence, Miss Carson!'" Science, Gender, and the Reception of *Silent Spring*, *Feminist Studies* 27, no. 3 (Fall 2001): 733-753.

³⁷ Craig Waddell, 'The Reception of *Silent Spring*. An Introduction,' in Waddell, ed., *And No Birds Sing*, p. 9 and n. 3, p.13; Christine Oravec, 'An Inventional Archaeology of "A Fable for Tomorrow,"' in Waddell, ed., *And No Birds Sing*, pp. 42–59 (here p. 43).

³⁸ Carson, *Silent Spring*, p. 22.

³⁹ Oravec's study charts Carson's many, thoughtful revisions to the final shape and fictional content of the prologue. Oravec, 'An Inventional Archaeology.'

⁴⁰ June Howard, 'Widening the Dialogue on Feminist Science Fiction,' in Gary Wolfe, ed., *Science Fiction Dialogues* (Chicago: Science Fiction Research Association, 1982), pp. 99. 155–168; Sarah Lefanu, *In the Chinks of the World Machine: Feminism and Science Fiction* (London: The Women's Press, 1988), p. 3.

⁴¹ Joanna Russ, 'What Can a Heroine Do? Or Why Women Can't Write,' in Joanna Russ, *To Write Like a Woman: Essays in Feminism and Science Fiction* (Bloomington and Indianapolis IN: University of Indiana Press, 1995), pp. 79–93 (here p. 81). Russ stakes her claim to the originality of her feminist position when she writes (p. 79) that the essay was originally written in 1971 and published in 1972.

⁴² Russ, 'What Can a Heroine Do?' p. 91.

⁴³ Russ, 'What Can a Heroine Do?' p. 92. See also Robin Roberts, *A New Species: Gender and Science in Science Fiction* (Urbana IL: University of Illinois Press, 1993).

⁴⁴ Marilyn Hacker, 'New Introduction,' in Joanna Russ, *The Female Man*, first published 1975 (Boston: Gregg Press, reprint 1977), p. xxiii.

⁴⁵ Sandra Harding, *The Science Question in Feminism* (Ithaca NY: Cornell University Press, 1986), p. 9. See also Harding's *Whose Science? Whose Knowledge: Thinking from Women's Lives* (Ithaca, N.Y.: Cornell University Press, 1991).

⁴⁶ Harding, *The Science Question in Feminism*, p. 20.

⁴⁷ Harding, *The Science Question in Feminism*, p. 20. See also Nancy Tuana, ed., *Feminism and Science* (Bloomington IN.: University of Indiana Press, 1989). The McCaffrey short story that gave title to the book first appeared in 1961, in *The Magazine of Fantasy and Science Fiction*.

⁴⁸ Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (New York, NY: Routledge, 1989), p. 5. See also Jane Donawerth, *Frankenstein's Daughters: Women Writing Science Fiction* (Syracuse NY: Syracuse University Press, 1996), pp. 36–37.

⁴⁹ Haraway, *Primate Visions*, p. 4.

⁵⁰ Haraway, *Primate Visions*, p. 15; see also Teresa de Lauretis, 'Signs of wa/onder,' in de Lauretis, Andreas Huyssen, and Kathleen Woodward, eds., *The Technological Imagination* (Madison WI: Coda Press, 1980), pp. 159–174.

⁵¹ Haraway, *Primate Visions*, p. 370. And see Charles Elkins' review-article on Haraway's *Primate Visions*, Elkins, 'The Uses of Science Fiction,' *Science Fiction Studies* 17 pt. 2 no. 51 (July 1990).

⁵² Haraway, *Primate Visions*, pp. 4–5, and chapter 16.