JOHANNA HEIL

Walking the Möbius Strip

An Inquiry into Knowing in Richard Powers's Fiction

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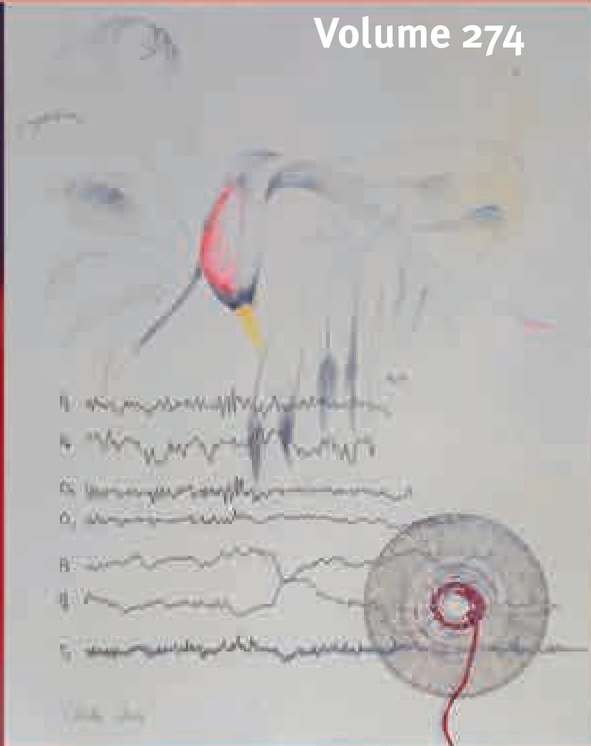

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Abbreviations of Richard Powers's Works

G2.2	*Galatea 2.2*
PtD	*Plowing the Dark*
TGBV	*The Gold Bug Variations*
TEM	*The Echo Maker*
TOS	*The Time of Our Singing*

1. Knowledge in/and Richard Powers's Fiction: An Introduction

> Once upon a time, in some out of the way corner of that universe which is dispersed into numberless twinkling solar systems, there was a star upon which clever beasts invented knowing. That was the most arrogant and mendacious minute of "world history," but nevertheless, it was only a minute. After nature had drawn a few breaths, the star cooled and congealed, and the clever beasts had to die. (Nietzsche, "Truth and Lies" 79)

> I could eavesdrop in any direction, and trawl the same topic: the nature of the knowable, and how we know it. (Powers, *Galatea 2.2* 66)

Sixty-five years after mathematician Alan Turing proposed his "imitation game" as a way to evaluate artificial intelligence, ground-breaking news of a computer program that "won" the Turing Test made it into international news on June 9, 2014.[1] The computer program Eugene Goostman successfully passed as a 13-year-old Ukranian boy because 30 percent of the British judges were convinced that their interlocutor was, in fact, human (University of Reading n.pag.). Immediately after the results were published, critical voices in the press

[1] Cf., for example, Celeste Biever's article "No Skynet: Turing Test 'Success' Isn't all It Seems" on *newscientist.com* or Gary Marcus's article for the online version of *The New Yorker* "What Comes after the Turing Test."

countered that the conclusions were to be taken with a grain of salt since the computer pretented to be an adolescent non-native speaker of English: both his linguistic as well as his intellectual abilities would not be expected to meet the standards of an adult native speaker of any language (Biever n.pag.). But, more importantly, as Gary Marcus comments, “no existing program . . . can currently come close to doing what any bright, real teenager can do: watch an episode of ‘The Simpsons,’ and tell us when to laugh” (n.pag.).

These grains of salt add just the right amount of flavor to the Turing Test; they highlight that the singularity of human intelligence is constructed as one of the last strongholds of the unique position of humanity. As soon as a computer program is programmed well enough to pass the formal requirements, the press’s reaction is one of ifs and buts. While the requirements of the test as Turing formulated it only ask that human judges cannot tell from the answers that a machine gives whether it is human or machine, the objections raised in the press primarily addressed the all too human qualities of knowledge and understanding, namely that intelligence is also social, situational, practical, non-propositional, and non-standardizable. At the same time, Eugene Goostman’s clever bluffs to questions he could not answer—“[w]hen asked what “Cheers” was about, [the progarm] responded, ‘How should I know, I haven’t watched the show’” (Marcus)—seem plausibly social and situational, and they at least attest that Eugene has been programed well enough to ‘know’ how to fake it. After all, one could argue that to successfully ‘fake it till you make it’ requires skill, practice, and implicit understanding. What is forgotten in the critical responses, however, is that the real feat is not that of Eugene Goostman’s imitation, but that of the researchers and programers who were able to formalize not only facts but also the ability to successfully get around answering questions directly that the program had not been trained to answer.

This particular Turing Test and the responses to it point out clearly that human knowledge and intelligence is precious to humans and constitutes an invaluable good that depends as much on what is known as it depends on the knower him- or herself. The test also highlights that human knowledge is not only (or not mainly?) that which can be formalized, but also that which lingers tacitly, implicitly, and contextually. As Marcus’s response to Eugene Goostman’s performance

indicates, computer science delivers results, but these results mean different things in different contexts. While Eugene Goostman's success is a "'wake-up call to cybercrime'" (Warwick qtd. in U of Reading) with serious implications for some, it fails to demonstrate human intelligence for others.

For the novelist Richard Powers, this discrepancy has been fuel for fiction. Knowledge and understanding figure prominently in his work, and the Turing Test specifically inspired his novel *Galatea 2.2* twenty years before Eugene Goostman hit the headlines. Not only *Galatea 2.2* but also *Plowing the Dark* and *The Echo Maker*, all three of which will be discussed in this study, as well as many of his other novels delve into the murky and controversial depths of how knowledge and understanding can be fathomed and who or what can figure as a knowing and understanding "subject"/actant. Powers's novels explore the reciprocal connections and intersections of the sciences and arts; they test humanity through its own inventions, and raise questions concerning the environments that we create and the kinships that we deny. Powers's methods of inquiring into knowing are narrative and meticulous research; his way of processing and understanding is narrative fiction, which lives by metaphor and rhythm, fact and imagination, the explicit and the implicit, and the spaces in between. But although he operates within the mode of narrative fiction and art, which provide "a more generally accessible space where the questions of truth can be rehearsed" (Sleigh 22), his novels carefully present both the opportunities and vulnerabilities of conflicting modes of understanding in their broader intellectual, scientific, and cultural contexts. Of the eleven novels Powers has published as of 2016,[2] this study will focus on aspects of spaces of knowing in *Plowing the Dark* (chapter 3), bodies of knowing and the embodiment of knowledge in *Galatea 2.2* (chapter 4), and delusions of knowledge in *The Echo Maker* (chapter 5). But Powers's work in general contributes to the intellectual and aesthetic negotiation of propositional knowledge (that is, knowledge that can be verbalized) and non-propositional knowledge (that is, knowledge that

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[2] *Three Farmers to Their Way to a Dance* (1985), *Prisoner's Dilemma* (1988), *The Gold Bug Variations* (1991), *Operation Wandering Soul* (1993), *Galatea 2.2* (1995), *Gain* (1998), *Plowing the Dark* (2000), *The Time of Our Singing* (2003), *The Echo Maker* (2006), *Generosity* (2009), and *Orfeo* (2014).

cannot be described linguistically) in the arts and sciences. By way of introducing Powers's work, let me draw attention to two of his other novels, *The Gold Bug Variations* and *The Time of Our Singing*, in which it is the rhythms and melodies, harmonies and cacophonies of music fold and unfold soundscapes of understanding.

The Gold Bug Variations, Powers's third novel, illustrates how musical inspiration transforms and inspires a researcher's scientific mind. When, in the 1950s, the molecular biologist Stuart Ressler first listens to Glenn Gould's 1955-recording of Bach's *Goldberg Variations*, he experiences an unprecedented epiphany:

> The first sound of the octave, the simplicity of unfolding triad initiates a process that will mutate his insides for life. The transparent tones, surprising his mind in precisely the right state of confusion and readiness, suggest a concealed message of immense importance. But he comes no closer to naming the finger-scrape across the keys. The pleasure of harmony—subtle, statistical sequence of expectation and release—he can as yet only dimly feel. But the first measure announces a plan of heartbreaking proportions. What he fails to learn from these notes tonight will lodge in his lungs until they stop pumping. (*TGBV* 156-57)

Although Bach's music inspires his endeavors to crack the genetic code, Ressler fails to transfer the musical structures that Glenn Gould's interpretation awakes to life into scientific, propositional knowledge. He never succeeds in decoding DNA because he leaves the project, but the novel nevertheless implies that, had Ressler continued his research in biology *and* music, Bach's composition would have guided him to the key of understanding the molecular composition of our hereditary structure. Years later, Ressler explains:

> "I thought: 'No wonder this Bach fella is so great a composer. He anticipates Watson and Crick by two hundred years.' Idiot! And I grew worse with the piece before it was all over. It didn't take me long to discover in the music all sorts of parallels. . . ." (191)

Only in hindsight can Ressler understand that the composition of the *Goldberg Variations* resembles the composition of DNA: the *Variations* develop from four quatrains of bass notes, which are structurally varied, while "a line in a particular variation . . . separated like an independent

filament of DNA—part of the melodic line, but simultaneously apart" (190, 191). Despite this grand analogy that Ressler felt and heard between DNA and Bach's music, the *Goldberg Variations* would not help him crack the code because Ressler was captivated by the methodological limitations of intuition: "But at the end, the music refused to reduce, and it hurt worse than before. I was a good empiricist, and just as causality was forbidden me, so was prescription. All an empiricist is allowed to do about terrible possibility is describe it" (193). Ressler's epiphany, and his inability to make scientific sense of it, discloses methodological as well as intellectual limitations in both artistic intuition and empiricist science. Glenn Gould's interpretation leaves him with "a state of wonder,"[3] yet he is unable to negotiate musical and molecular composition and translate his intuition into verifiably propositional content.

Twelve years after the publication of *The Goldbug Variations*, Powers returned to writing about music and science in *The Time of Our Singing*. This novel offers a variation of *The Goldbug Variations*'s theme and raises questions about the political responsibility of art and research. The quantum physicist David Strom is given tenure at Columbia University as the "least published member of the department ever to make permanent faculty" (409). His career and reputation as a brilliant physicist is not based on the three articles he has published, but on his talent in teaching and advising (his students "land sterling jobs—Stanford, Michigan, Cornell" [410]) and on his ability to navigate his colleagues through the theoretical problems they are working on over a cup of coffee. David Strom has an almost magical gift for drawing out problems on a piece of napkin, never solving the equations himself but giving his colleagues "something invisible" that is "faster, cleaner, lighter" (410) than their own thinking. "No one can say exactly what David does. Nothing rigorous. He just displaces them. Moves them around the sealed space until they find the hidden door" (410-11). He himself tells them:

> "You must learn to listen," he says. If particles, forces, and fields obey the curve that binds the flow of numbers, then they must sound like

3 *State of Wonder* is the title of the 2002 release of Glenn Gould's first recording in 1955 and his last recording in 1981 of Bach's *Goldberg Variations* as a two-CD set by Sony Music Entertainment Inc.

> harmonies in time. "You think with your eyes; this is your problem. No one can see four independent variables mapping out a surface in five or more dimensions. But the tuned ear can hear chords."
> His colleagues dismiss this talk as mere metaphor. (411)

As in *The Goldberg Variations*, Powers here evokes the non-propositional power of what music knows in a scientific context. Music, itself formally following the laws of mathematical harmony, transcends its propositional basis and creates a tonal space in which David Strom can hear and think many complex layers simultaneously. His wife Delia understands that

> [h]er husband *hears* his way forward. Melodies, intervals, rhythms, durations: the music of the spheres. Others bring him their deadlocks—particles spinning backward, phantom apparitions in two places at once, gravities collapsing at themselves. Even as they describe the hopeless mysteries, her David hears the rich counterpoint coded in the composer's score. (411, my emphasis)

Whatever it is that escapes the other scientists' gaze, David Strom finds ways to make visible, palpable, and propositional what would otherwise remain invisible.

While *The Time of Our Singing* stresses the physicist's non-propositional ethos of thinking, it also raises questions of the ethical responsibility of both scientist and artist: during World War II, David Strom is a member of the Manhattan Project, and although he does not contribute directly to the development of the atomic bomb, he "free[d] up the thoughts of the men who made the design" (411). *The Time of Our Singing* here emphasizes not only the role of non-propositional artistic thinking and understanding in scientific contexts but also the responsibility and guilt of the scientist and artist in regard to their creations. This critique connects *The Time of Our Singing* to the novels discussed in this study, in which painting, poetry, narrative fiction, and computer programs (in *Plowing the Dark* and *Galatea 2.2*), or narratives of medical truths (in *The Echo Maker*) unfold and develop repercussions beyond control and anticipation. Raising the question whether the lack of active political engagement on the part of the artist and scientist is in and of itself an act of guilt, the epistemological dimension of Powers's writing is intricately entwined with the political responsibility of art and science.

Art and science emerge as inherently political, and artists and scientists are never offered a way out of the political. This is most prononunced in *The Time of Our Singing*: Jonah Strom, the pale son of Jewish German physicist David Strom and African American singer Delia Daley, is himself a singer of *lieder*, who long refuses to acknowledge his African American heritage during the Civil Rights Movement of the 1960s. To the disgust of his younger sister, who is much darker and who becomes a member of the Black Panthers, Jonah disregards history in singing the *lieder* of a white, privileged class and race, because he believes in the beauty and magic of pure music. Although Jonah is aware of his position and his occupation, a postmodern irony inhibits him from taking a stand: he deems the study of history useless (263), considers the March on Wahsington superfluous (264), and turns his skin color into a joke (e.g., 265). He trumps his parents' idealism with his own naïve and pretentious aloofness.

The Strom family, a project of interracial love doomed to fail in the middle of the twentieth century due to the country's racial and racializing history, shows that a denial that the personal is political has serious repercussions for science and art. After Delia understands that her husband has been working for the Manhattan Project, she thinks about the future of her children, "paper white against one crowd, lamp black against the other" (413). Only in the privacy of their home will they be able to enjoy the utopian life that their parents spun out of the fabric of hummed melodies and syncopated rhythms. While Delia struggles with the racial prejudice of her own country, David has problems understanding that the public will not acknowledge and honor their post-racial dreams. The powerful public invades the vulnerable private life and thoughts of Delia, but only when David's father-in-law demands an explanation for the unnecessary bombing of Nagasaki (he thinks that dropping the first bomb on Hiroshima was justified) does David feel the pressure of the outside world seep into his personal life. Delia's father accuses the government as well as the physicists of racism directed "against the darker shades" for the sake of "project[ing] a final superiority, the same world dominance [he] thought [they] were fighting this war to end" (415). David's propositional knowledge of physics and his tacit understanding of music do not suffice to comprehend this nation's explicit and implicit racism.

As much as Powers's novels advocate a complex interplay of propositional and non-propositional knowledges and a mutual understanding of the explicit and the implicit, they cannot help but painfully illustrate the indidivual and structural failures of the knowledges and the following consequences. This is also true for the three novels that will be at the center of this inquiry, *Plowing the Dark*, *Galatea 2.2*, and *The Echo Maker*, which introduce and pursue different scientific, intellectual, and artistic discourses, share an interest in embodied and intellectual perception, and offer alternative spaces and bodies of understanding and knowing.

In *Plowing the Dark*, different strands of narration circle around the creation of virtual realities. One is the virtual reality that the captive Taimur Martin creates with the power of his mind in order to have a narrative to hold on to during captivity. The other is a computer assisted virtual environment created by computer programmers and designers, the painter Adie Klarpol and her college friend Steve Spiegel, a former poet turned programmer. While Taimur Martin uses his imagination and his memories, the programmers and designers use technology and Adie's visualizations, but the goal in both plotlines is to manipulate their minds/brains into accepting something that is not (yet or anymore) accessible as reality. The characters need to inquire into their pasts, their beliefs, and convictions in order to establish alternative environments and habitats. While creating the new, science meets poetry, paintings meet virtual warfare, and the question that is put forward is whether poetry makes anything happen. In *Galatea 2.2*, a cognitive neurologist, Philip Lentz, and an author, Richard Powers, try to program a thinking machine to pass a Master's Comprehension Exam in literature. While Richard has to find ways to teach a computer how to interpret literature and is confronted with what fiction knows and how we understand its alleged knowledge, he recollects the tangled paths of his life. *The Echo Maker* grants its readers a glimpse into the maze of contemporary neuroscience through the case of Mark Schluter, who suffers from Capgras Syndrome, a rare condition that keeps him from emotionally recognizing his sister. His condition changes him and also the people around him, and it illicits a personal and professional crisis in the neurologist Dr. Gerald Weber, who attends to Mark's case. The novel scrutinizes our ability to know in both scientific and in narrative ways

and uncovers different strategies for making sense of ourselves and the world. *The Echo Maker*, *Plowing the Dark*, and *Galatea 2.2* all inquire into contemporary science and art, into knowing and into the aporia of knowledge.

1.1 Powers's Contemporary Fiction

Since the early 2000s, a number of literary scholars have noticed a shift in aesthetics and attitude characterized by "draw[ing] upon, and put[ting] into play, aesthetic strategies that have their roots in both 'classical' realism and . . . 'classical' postmodernism" (Claviez 6). Describing Richard Powers's prose, Joseph Dewey accordingly remarks that it takes a "hybrid position" between realist and postmodern styles (3). Powers, like "David Foster Wallace, Jonathan Franzen, . . . Maxine Hong Kingston, Mark Z. Danielewski," and others give voice to an aesthetic shift that has been labeled, among others, post-postmodernim, "neorealism" (Brooks and Toth, "A Wake" 7-8, 8)[4] or "radical realism" (Odin 158).[5] José López and Garry Potter's term "critical realism" describes a similar intellectual shift in literary studies, philosophy, and the social sciences, which is emerging "simply because postmodernism is inadequate as an intellectual response to the times that we live in" ("After" 4). This post-postmodern reponse, Klaus Stierstorfer argues, "is not simply a backlash in response to postmodern cultural production; it is neither a reactionary return to the (ethical) imperatives of modernism nor a revival of the traditional forms of realism and ethical discourse that proliferated in [the] nineteenth-century" (Brooks and Toth, "A Wake" 9). This trend seems uncontested by literary scholars, but a

[4] "Demonstrating some type of renewed faith in the possibility of what postrmodernism narrative repeatedly identified as impossible: meaning, truth, representational accuracy, etc." (Brooks and Toth, "A Wake" 9).

[5] Radical realim is "combin[ing] realistic details with a skillful incorporation of postmodern narrative strategies to depict an experience that is profoundly affected by scientific and technological reorganization of the sociopolitical, cultural, and economic conditions of production as well as consumption" (Odin 258)

debate has developed over whether this return is a reactionary return to realist forms or whether it can be assessed as a genuine expression of a contemporary post-postmodern situation. In the introduction to the special issue on *Neorealism* of *Amerikastudien/American Studies* in 2004, Thomas Claviez argued that we still lack "the safe historical distance from which to evaluate and judge the process, let alone attempt a more detailed diagnosis of its emergence, qualities, and effects" (5). Ten years later, scholars are confident to assume that we are indeed "in the face of an epistemic break" as Claviez suggested in 2004 (5).

The present study shows that Powers's fiction has been and still continues to be indicative of this change, which López and Potter describe as an "epistemological caution with respect to scientific knowledge, as opposed to a self-defeating relative skepticism" that grows out of the simple fact that "[h]uman beings produce knowledge and human beings can be mistaken. Science is not pure and can contain an ideologically distorted element in both explanations and the methods used to arrive at them" ("After" 9). While social and other structural conditions shape knowledge production, López and Potter also maintain that "knowledge cannot be reduced to its sociological determinants of production" (9). Post-postmodernism, then, positions itself as "a period of 'faith without faith,' of 'religion without religion,' of 'mimesis without mimesis,' etc, etc" (Brooks and Toth, "A Wake" 9), constructing and equipping the space in the radical middle between a premodern Truth and a postmodern ironic relativism.

Heinz Ickstadt argues that Powers "places himself in a continuity of modern and pre-modern traditions of the novel and evokes existing conventions of plot and character, . . . us[ing] them for the purpose of undermining them" (26). But he also suggests that, with Powers, "'realism' is, in fact, a highly innovative and self-conscious constructivism in so far as all categories traditionally connected with the term . . . are . . . always part of a fluid process of construction, narrativization, reinvention" (6). Powers is able to promote this process as a cognitive and epistemic device because he acknowledges the power of narrative but does not disregard the epistemic drawbacks of smoothing out the ruptures, breaks, and fissures with which our raw and unmediated perception would otherwise confront us; his novels never fall for a 'narrative fallacy' by instantiating narrative as a powerful metanarrative (even though some of his characters will do so). Rather,

his fiction dares to offer a new trust in narrative as a device that establishes coherences in a world that may not necessarily correspond to the picture painted while, at the same time, self-reflexively and metafictionally disclosing what it is doing.

Concentrating on the realist aspects of Powers's fiction, Charles B. Harris turns to the particular forms of realism of *Plowing the Dark* ("Technoromanticism") and *The Echo Maker* ("Story"). In his article on *Plowing the Dark*, Harris traces how "Powers reappropriates in order to recontextualize the conventions of representational realism" ("Technoromanticism" 110) and thereby manages "to think mimesis and anti-mimesis together" (Gibson qtd. in Harris 110). Quite generally speaking, realism in contemporary literature has shifted from denoting a mimetic form of representation and has become "an historical and stylistic phenomenon . . . no more a mere mirror of reality than any other style" (Nochlin qtd. in Harris 110; ellipsis in original). Were it not for the sudden disruptions that intersperse Powers's fiction, his novels would certainly adhere to "mimetic conventions and a mimetic 'content'" (110). For instance, while a number of critics have read *The Echo Maker* as merely restaging nineteenth-century psychological realism,[6] Harris proposes that it "recontextualizes the conventions of psychological realism" and that Powers steers the novel into a "new direction" ("Story" 242) of "*neurological realism*" that "doesn't abjure psychology so much as shift the emphasis" (243). In each of Powers's novels, the employment of realist narrative strategies only underlines the eventual ruptures, discontinuities, and unknowns. Or, as Harris puts it:

> Whereas traditional psychological realism affirms, indeed, requires, the concept of a solid and continuous "inner" self, Powers, drawing on contemporary neuroscience, challenges that concept at every turn. . . Whereas traditional psychological realism continues the longstanding reification of dualisms—inner and outer, mind and body, reason and emotion, self and other—Powers . . . dismantles such dualisms on neuroscientific grounds. (243)

Powers's ultimate tool for dismantling dualisms and for deconstructing coherence continues to be the narrative, the literary, the poetic, the

6 Harris names the reviews of William Deresiewicz, James Wood, and Dan Green.

almost ekphrastic, the artistic, and the magical and fantastic. All of the above are then connected to discourses of literary criticism, science studies, the history of science, computer technologies, AI research, medicine, physics, music—to name but a few—which are firmly rooted in rational and actual, non-magical, non-fantastic research.

Although Powers's fiction is praised for its meticulous research and scientific details, the novels examined in this study hardly qualify as factual or realistic narratives. They deliberately deploy literary strategies that interfere with scientific and historical integrity and offer counterfactual scenarios to what is technologically and scientifically possible. The question explored in this study, then, is how we can frame the epistemic value of Powers's fiction, which is inherent in mimesis and yet infringes upon realistic representation. I recognize Powers's fictions as narratives and works of art that carry an epistemic, if not necessarily always a rationalist, value. While science is bound to remain propositional and objectively verifiable, literature is free to explore the unintelligible, intangible, and improbable.

Galatea 2.2 and *Plowing the Dark* especially move beyond the actually possible without quite transgressing the boundaries of realist fiction. They echo magical realist elements in so far as they move "outside the boundaries of enlightened discourse without losing touch with the real" (Warnes 488). In "Scheherazade's Children," Wendy B. Faris offers a number of primary characteristics to describe magical realism that also figure subtly in Powers's fiction. Although Powers's novels abstain from employing "an irreducible element of magic," they do contain "something we cannot explain according to the laws of the universe as we know it" (167). Scholz, for instance, observes that because

> Powers's books are set in very particular corners of the contemporary world, it is not immediately obvious that the technologies they describe are counterfactual. . . . Powers steps us sideways, not into futurity, but into a false alterity, a world exactly like ours, except that a nascant technology has been plausibly amplified and extended. (295-96)

Powers creates a fictional landscape akin to the realist part of magical realism by—and this is Faris describing magical realism—"detail[ing] a strong presence of the phenomenal world" to the effect that the fictional world "resembles the one we live in, in many instances by extensive use

of detail" (169). But with the novels investigated in this study, just as with magical realism, "[t]he reader may hesitate (at some point or another) between two contradictory understandings of events—and hence experiences some unsettling doubts" (171). *Plowing the Dark*, *Galatea 2.2*, and *The Echo Maker* share with magical realism a "closeness or near-merging of two realms, two worlds" (172) and, like magical realist texts, they "question ideas about time, space, and identity" (173). Rawdon Wilson adds that, in magical realism, the "copresence of oddities, the interaction of the bizarre with the entirely ordinary, the doubleness of conceptual codes, the irreducibly hybrid nature of experience strikes the mind's eye" (210). Admittedly, such 'magical' elements only come to the fore once or twice in each novel, but these blatant perturbations of realistic modes of representation disrupt the otherwise credible storylines of Powers's novels and eventually challenge their overall propositional and scientific credulity.

Considering Powers's fictional worlds of "false alterity" (Scholz 296), his vital interest in contemporary science sometimes leans towards the representational tradition of science fiction. Science fiction "is determined by the *dialectic* between estrangement and cognition" (Freedman qtd. in Chu 4), a continuum defined by the far ends of fantasy, myth, and fairy tale (Freeman's "complete estrangement") and "'realistic' or mundane" fiction (Freeman's "complete cognition") (Chu 4). However, Chu does not consider science fiction and realism to stand in an antonymic relation (8); he sees their difference in science fiction's "capacity to generate mimetic accounts of aspects of reality that defy straightforward representation" (10). Although I do not intend to label Powers's novels as science fiction,[7] I seek to emphasize that, especially

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[7] Negotiating a viable category for Powers's work, Sabine Sielke uses the term "'(science) fiction'" and adds the following in a footnote: "Please note that I use the concept '(science) fiction' as a crutch and as one crutch among potential others: Latour speaks of Powers as a 'novelist of 'science studies'' . . . and reuses the old label 'scientification,' though with some reservations . . .; Lantos calls Powers the outstanding practioner of 'bioliterature' . . . Each of these terms, and others, work without necessarily resolving the question of how science and fiction 'relate' (and I [Sielke] mark the term relate here because it remains highly imprecise if not misleading); after all, that question is at the heart of Powers' work an currently being answered in different ways in different contexts" ("Subject" 239).

in *Galatea 2.2* and *Plowing the Dark*, it is estrangement rather than cognition within the interfaces of the arts and the sciences that creates moments "that [pass] all understanding" (*PtD* 414), which require particular scrutiny.

This implies that, although he honors "the realist," Powers never (re)activates an aesthetics that has been exhausted; rather, he discovers new possibilities (cf. Barth, "Literature of Exhaustion"). Powers creates a poetics that feeds on romantic, realist, magical realist, modern, and postmodern aesthetics: one that negotiates the attitudes towards knowing articulated in these literary modes and that weaves them into an intricate net of understanding. This is why I find the term "neorealism" (Brooks and Toth's term of choice) inadequate to describe and categorize Powers's fiction; it suggests a return to realist aesthetic conventions and to a conviction that these conventions can represent the contemporary world. Potter and Lopez's term "critical realism" points to the critical distance that contemporary literature takes towards the realist mode even when utilizing realist aesthetics. But to characterize Powers's novels, both terms put too much stress on the surface phenomenon of realist narrative strategies; applying them would polish the novels' surfaces, make them appear smoother than they actually are, and suggest a conservative return to a pre-modernist past. Instead of stressing 'the realist,' I want to stress the modern and postmodern heritage of Power's fiction in light of the shift towards a post-postmodern aesthetics.

This aesthetic shift in prose fiction mirrors a broader shift in the contemporary world that brings art, science, and technology closer together. Two of the markers of this shift can be found in the development of the digital and the advancement of the cognitive sciences in cultural production. Kélina Gotman, for instance, proposes that the early twenty-first century is witness to a "neuroscientific turn" that employs a "neural metaphor," which effectively creates "an attempt to reconcile the modernist desire-for-science with a familiar postmodern relativism" (84). This shift, she claims, "is a post-postmodern turn, an extension of postmodernism wrapped back into science, poeticized and integrated into philosophical thought" (84). I argue that the philosophical thought of post-postmodernism can be fruitfully contextualized with the help of Frank Kermode's suggestion that the modern is the late romantic (cf. *Romantic Image*) and Brian McHale's identification of the modern-epistemological (*Postmodernist Ficion* 9) and the postmodern-

ontological dominant (10). I argue that the narrative pattern of Powers's fiction interweaves postmodernity's dominant preoccupation with ontology with a modernist concern with epistemology and creates an oscillating fabric that complicates identifying its dominant. Hanging "in midair" (as Powers so often writes in his novels), creates "possible worlds . . . in-between, amphibious—neither true nor false, suspended between belief and disbelief" (McHale 33), which McHale identifies as one of postmodernism's poetic thematics (27). At the same time, Powers infuses this "hybrid" between realist and postmodern aesthetics (Dewey 3) with a modified desire for (re-)enchantment.

Just as "[p]ostmodernism is not post modern . . . but postmodern*ism*," post-postmodernism "signifies a poetics which is the successor of, or possibly a reaction against the poetics of" mid-twentieth century postmodernism (McHale 5). And just as postmodernism "signifies a poetics" that comes "after the *modernist movement*," "follow[ing] *from* modernism" (McHale 5) as a reaction towards modernity, post-postmodernism does not succeed postmodernism *or* modernism but adjusts their aesthetics and shifts its own attention, its dominant, slightly.[8] The awkwardness of the term post-postmodernism points as much the genealogy of twentieth-century aesthetics and critical thought as it emphasizes its own unsteady space in literary history. The affix "post-post" may at once amplify the component of "POSTmodernISM" (Hassan; cf. McHale 5), but at the same time it may cancel out the very concept of it (much like a double negative creates a positive), thus effectively emphasizing the modernist.

The modernist's struggle with modernity is commonly read as the fight against "the ephemeral, the fleeting, the contingent" (Baudelaire qtd. in Foucault, "Enlightenment" 46; cf. D. Harvey 10). According to Michel Foucault, "being modern does not lie in recognizing and accepting this perpetual movement" but "in recapturing something eternal" in order to "'heroize' the present" (Foucault, "Enlightenment" 46). The modern "simultaneously respects reality and violates it" (47), acknowledging the deep and irrepealable ruptures and fissures without ever abandoning the hope to repeal them. T.S. Eliot's *The Waste Land*

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[8] For McHale's discussion and adaptation of Jurij Tynjanov's and Roman Jakobson's use of the term "dominant," see McHale's *Postmodernist Fiction* (6-8).

serves as a good example for Foucault's points because despite "shor[ing] [these fragments] against my ruins," Eliot is able to close his poem with the mantra "Shanti shanti shanti" (20), evoking "'the peace that passeth all understanding,' that resolves all conflicts, fulfills all desires, and banishes all fear" (Easwaran n.pag.). To Foucault, rearing up to reality like this, "violat[ing] it" ("Enlightenment" 47), is the ironic response of modernism to modernity, which was shaped above all by the process of rationalization epitomized in (post-)Cartesian philosophy and (post-)Newtonian physics (cf. Coole and Frost, "Introducing the New Materialisms" 8). Following Ernst Cassirer, David Harvey describes the project of Enlightenment as the "secular movement that sought the demystification and desacralization of knowledge and social organization." The Enlightenment project sought to "liberate human being from their chains" (13), but Frank Kermode draws attention to the modernists' feeling that this liberation came at the high cost of what T.S. Eliot describes as "the dissociation of sensibility" advanced by seventeenth-century poetry (outlined in "The Metaphysical Poets" in 1921). It is not so much Eliot's specific history of this disastrous dissociation that interests Kermode—he offers alternative readings of this dissociation—, but the circumstances of the early twentieth century that prompted Eliot and others to initiate the very discourse (see 141-43).

T.S. Eliot laments the "dissociation of sensibilities" while, around the same time,[9] Max Weber's discussion of the "disenchantment of the world" answers critically to a "world that has become calculable in principle" in which "the principle of calculability tends to overrule, even if it does not always overpower, experience" (J. Bennett, *Enchantment* 59). Weber questions the positive and negative effects of the ongoing rationalization, scientization, industrialization, mechanization, and bureaucratization of modernity, which he assumes as "the fate of our times" ("Science as a Vocation" 155).[10] His views on the

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[9] Max Weber's "Religious Rejections of the World and Their Directions" was published in 1915 and his lecture "Science as a Vocation" was published in 1918 (Gerth and Mills 323; 129).

[10] Jane Bennett summarizes Weber's arguments from "The Social Psychology of Religion": "In addition to eschewing magic as a strategy of will, (i.e., 'scientizing' desire), rationalization also systematizes knowledge (i.e., pursues 'increasing theoretical mastery of reality by means of increasingly

"disenchantment of the world" is a dialectical sociological discussion that answers to the sentiment of loss and yearning for a past, premodern culture that is expressed in Eliot's "dissociation of sensibilities"—this is a culture that is pre-rational(ized), or at least does not superimpose the rational over the sensible and enchanted, and Eliot wishes for a re-association of sensibilities. Weber captures this sentiment, which he witnesses in many of his (young) contemporaries for whom "the intellectual constructions of science constitute an unreal realm of artificial abstractions, which with their bony hands seek to grasp the blood-and-sap of true life without ever catching up with it" ("Science as a Vocation" 140-41).

Political theorist Jane Bennett comments that "in Weber's version [of the disenchantment story], we are both to regret and to embrace the cultural effects of disenchantment" (*Enchantment* 64); and other modernist artists and thinkers fully embraced and utilized Weber's position. This gestures toward the "maelstrom of perpetual disintegration and renewal, of struggle and contradiction, of ambiguity and anguish" (Berman qtd. in D. Harvey 11) that characterizes modern life and modernist cultural and critical production. And it hints at why the modernist aesthetics and "understanding had to be constructed through the exploration of multiple perspectives" and why "[m]odernism . . . took on multiple perspectivism and relativism as its epistemology for revealing what it still took to be the true nature of a unified, though complex, understanding of reality" (D. Harvey 30). Modernist art therefore comprises the features of the dissociated, the ruptured, and the fragmented.

The fragmentary ties modernist art back to a pre-realist aesthetics because the fragment was also "the literary form proper to romanticism" (J. Bennett, *Enchantment* 77). The fragment "'perpetually postpones the possibility of finding a meaning to finitude' and thus 'provokes us into an acceptance of finitude'" (Critchley qtd. in Bennett 77). Simon Critchley observes that the Romantics' struggle was "'to reconcile the values of Enlightenment . . . with the disenchantment of the world that

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precise and abstract concepts'); instrumentalizes thinking (i.e., rejects 'all non-utilitarian yardsticks'); and, finally, reaplce straditional bonds as the basis of social order with those founded on the natural reason ofmen" (*Enchantment* 58).

those values seem to bring about'" (qtd. in Bennett 78). This is why, as Kermode argues,

> the poets and aestheticians of the Image turn their attention to history . . . in search of some golden age when the prevalent mode of knowing was not positivist and anti-imaginitive; when the Image, the intuited, creative reality, was habitually respected; when art was not permanently on the defensive against mechanical and systematic modes of enquiry. (143)

Powers's characters are often sympathetic to this yearning and follow this romanticist path; but traces of the Romantic Image inform not only the mind-set of his characters but also the themes and motifs of his novels. The Romantic Image, then, helps contextualizing the discursive history of knowledge in the contemporary American context as one that struggles with the two poles of modern rationalization and science, which "strips meaning from the world by reducing it to pure immanence or materiality" (J. Bennett, *Enchantment* 60).[11]

Powers's scientized fiction embraces the possibilities of modern science, but it also questions and criticizes the disenchanted, positivist, and anti-imaginitive as lopsided, one-dimensional, and, therefore, insufficient. Some of his characters seek refuge in science to escape the pitfalls of art; others naïvely overestimate the possibility of salvation that the Romantic Image may bring and/or underestimate the forces of the marketability of art and science. But while Powers's characters may walk away disillusioned and disheartened, his novels propose that fiction knows in a way that complements other ways of knowing and challenges his characters' disillusionment. Powers does not follow "the Symbolist conception of the work of art as aesthetic monad, as the product of a mode of cognition superior to, and different from, that of the sciences" (Kermode 157), but scientificizes fiction and poeticizes science with the help of a multiplicity of aesthetics and modes of understanding.

Antje Kley and Jan D. Kucharzewski emphasize that it is of particular interest to examine how the "aesthetics of Richard Powers' novels [and] their narrative patterns create or elicit 'Ideas of Order,' be

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[11] A disenchanted conception of materiality understands "matter [as] the antithesis of spirit and meaning" (Bennett, *Enchantment* 60). Bennett's 2010 book *Vibrant Matter* offers an alternative conception of matter.