

Chromodynamics: Science and Colonialism in Kim Stanley Robinson's Mars Trilogy

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Deal table in the middle, plain chairs all round the walls, on one end a large shining map, marked with all the colours of a rainbow. There was a vast amount of red—good to see at any time, because one knows that some real work is done in there, a deuce lot of blue, a little green

Joseph Conrad, *Heart of Darkness*

Red Mars, *Green Mars*, and *Blue Mars*, the hefty volumes making up Kim Stanley Robinson's epic Mars trilogy, are only three of numerous recent publications, including novels, popularizations, and occasionally combinations of both, dealing with the planet Mars.¹ The following excerpts are taken from two such publications:

There will be people on Mars long before the end of the twenty-first century. It's inevitable, and irresistible. It might happen before 2020. It could happen by 2011. Mars is our next frontier. The plans are being laid now, the missions designed. The technology exists. The latter-day equivalents of Magellan, Columbus and Cook, and all the other explorers of the age of European expansion, are preparing themselves. (Walter 1)

Plans are already afoot to send human beings to Mars. Behind these exciting possibilities lies a less worthy objective: an assumption that the Red Planet can be turned into something resembling a colony, an inferior Earth. [...]

[...] Mars must become a UN protectorate, and be treated as a 'planet for science,' much as the Antarctic has been preserved—at least to a great extent—as unspoilt white wilderness. We are for a WHITE MARS! (Aldiss 323)

These two quotations appear to pull in ideologically opposing directions: while the passage from astropaleobiologist Malcolm Walter's *The Search for Life on Mars* seems to advocate an unreconstructed gallop towards the "next frontier," Aldiss concludes his novel *White Mars* (written with the aid of mathematician and popularizer Roger Penrose) with the demand that Mars be treated not as a colony, but as a "planet for science."² But can these two notions—Mars as a colony and Mars as a "planet for science"—be considered unproblematic opposites?

That colonialism and science are, on the contrary, fellow-travellers, is indicated by casual reflection on the popular tropes of science—to seek new vistas, explore new fields, go where no one has gone before—and strongly supported by scholarly research. Historians of science have produced numerous demonstrations of the interdependent relationships among geographic exploration, commercial exploitation, and scientific expedition in the last few centuries. "[F]or most of humanity," argue Paolo Palladino and Michael Worboys, "the history of science and imperialism is the history of science" (102).

Just as significant are recent critiques of scientific discourse which suggest not just a historical and commercial, but also a discursive, link between science and colonialism. Feminist science scholars in particular have been quick to note the parallels between scientific and colonialist metaphors of conquest: "The fantasies that attend [the] gendering of the production and reproduction of knowledge are at once sexualized and territorial (we speak not only of 'penetrating' or 'unveiling' nature's mysteries but of 'opening up new horizons' or 'pushing back the frontiers of knowledge')" (Jacobus, Keller and Shuttleworth 6). Many of these critics advocate the development of an alternative form (or forms) of science—a "feminist successor science," to use Sandra Harding's term—which might avoid patriarchal discourse and practice (146). This feminist science would presumably be an anti-colonialist science; for, as ecofeminists have pointed out,

the relationship of exploitative dominance between man and nature, (shaped by reductionist modern science since the 16th century) and the exploitative and oppressive relationship

between men and women that prevails in most patriarchal societies, even modern industrial ones, [are] closely connected. [...] The devaluation of contributions from women and nature goes hand-in-hand with the value assigned to acts of colonization as acts of development and improvement. (Mies and Shiva 3, 25)

One of the most stimulating of recent studies of the relationships among science, colonialism, and patriarchy is Denise Albanese's *New Science, New World*, which focusses on the early modern period. Albanese states that "the repeated joining of the two topics in Renaissance texts makes clear that a rhetorical analogy exists between colonialism and science" (2). She treats science and colonialism as isomorphic modes of "power-knowledge, of conquest," modes that are "often mutually constitutive, interdependent, given their intermittent rearticulation within successive cultural formations" (59). Through her analysis of a number of seminal early modern texts, such as *The Tempest*, *Paradise Lost*, Bacon's *New Atlantis* and Galileo's *Dialogue on the Two Chief World Systems*, Albanese argues that this isomorphism can be connected in a complex way to the onset of the polarization of science and literature which has characterized the modern and postmodern periods. Writers such as Copernicus and Galileo, she suggests, by self-consciously employing "literary" forms to state their cosmological claims in order to avoid religious persecution, inaugurated a tradition in which "fiction" became defined in opposition to "fact," scientific truth-telling. This strategy, Albanese argues, replicated the strategies of colonial discourse: "as a consequence of the culturally productive mechanisms of opposition—particularly those mobilized by Renaissance colonialism—the emergence of modern scientific ideology in the seventeenth century resulted in the positing of fiction, of literary representation, as its binary (and prospectively devalued) opposite" (3). Like colonialism, and like patriarchy, science operates through a process of othering: just as the physical world is posited as object, as "other" to the observer, so literary discourse, a discourse of subjectivity, is othered, placed outside the realms of truth-telling.

The notion that the joint discourses of science and colonialism can be connected to the polarization of science and literature, fact and fiction, provides a particularly useful framework through which to investigate the Mars trilogy. Robinson writes within a genre which is itself riven by the literature/science split—"soft" knowledge versus "hard" knowledge. But also, as the name implies, science fiction, by its very nature, contests this split. Robinson has often been criticized for the "hardness" of his science fiction. John Gribbin, himself a writer of science fiction and a prolific popularizer of science, tells *New Scientist* readers that they would be better off perusing "the NASA manuals" than Robinson's *Red Mars*. This novel, Gribbin complains in his review, is "all science and no fiction." How Gribbin manages to overlook the highly complex maze of personality and politics that Robinson constructs in *Red Mars* remains a mystery. Nevertheless, for a trilogy that sets out to deal with immense political questions—where will we go next? how can we free ourselves from the destructive patterns of history? what forms might utopia take?—the Mars novels admittedly contain large passages dealing with detailed scientific description that seem to exceed the demands of the reality effect required by hard sf.

How can we read these detailed scientific passages as anything more than the maintenance of generic conventions and an established authorial style? How are we to integrate them into a novel which is explicitly, self-consciously political and explicitly, self-consciously postcolonial? From Wells to Welles, from Burroughs to Bradbury and beyond, Mars in science fiction has, perhaps more than any other location, been the site (or the source) of imperial desire and conquest. Robinson, by endowing his Martian landscape with the names of his literary forebears (Bradbury Point, Clarke and New Clarke, Burroughs, Sheffield), acknowledges this ancestry. His novels, like these earlier ones, represent primarily a narrative of colonization. The first settlement on Mars is referred to as a "colony" and its inhabitants as "colonists" (*Red* 193); later they are termed "settlers" and their children "natives," and new visitors from Earth (or "Terra") are considered "colonialists" (*Green* 740). As this linguistic positioning indicates, they frequently argue over the politics of postcolonialism, both on Mars and Earth. These arguments are

multifaceted: are humans justified in colonizing Mars, in terraforming its surface? Should Mars, once established, become independent from Earth? How might Mars interact with an Earth that has become a neo-colonial, late-capitalist nightmare, with metanational companies acquiring “flags of convenience” by buying up their foreign debt? The whole trilogy can, from one perspective, be seen as an attempt to theorize, or, more accurately, to narrativize, a postcolonial dystopia on Earth, and a postcolonial utopia on Mars; its central problematic is whether the two can exist simultaneously and interdependently.

So what place has science in all this? Why the minutiae of geology, botany, atmospheric physics, biochemistry, quantum mechanics, genetics, neuroscience, superstring theory, hydrodynamics, and construction engineering, which even *New Scientist* readers might find tedious?

Previous commentators on the Mars trilogy have not overlooked this question. Fredric Jameson takes the trilogy’s “pocket disquisitions” on science and technology as a starting point for his analysis, and bases his argument on the observation that “science and politics are not (or not only) two separate themes in the *Mars* trilogy (208,211).” Rather, “all of the scientific problems described in [the Mars trilogy], without exception, offer an allegory [...] of social, political, and historical problems also faced by the inhabitants of Mars (210-11).” According to Jameson, the trilogy forces readers to alternate their interpretive frameworks, moving continuously between “nature and human collectivities,” a process which tends “to problematize each one in turn, and to send us back to the other.” For Jameson, this goes some way toward explaining the trilogy’s “heterogeneities and the uneven sequence of great sheets of material.” Thus, “any first scientific reading of the *Mars* trilogy must eventually develop into a second allegorical one, in which the hard SF content stands revealed as socio-political—that is to say, as utopian (211).” Moving from his observation of the socio-political import of the scientific problems in the trilogy to a discussion of the constructed nature of all knowledge and the ambiguous positioning of the trilogy between “otherness and production (216),” Jameson proceeds to a sophisticated examination of the relationships among science fiction, realism, and utopias.

Jameson's broad idea that the scientific problems explored in the trilogy have a role in the working through of socio-political problems in the novels is one that my reading here aims to develop. However, I also want to point to an aspect of the trilogy that is not dealt with in detail by Jameson. Although Jameson does discuss the political conflicts with which the trilogy is riven, his treatment of "otherness and production" is concerned largely with questions of ontology, realism, and representation that do not leave room for in-depth consideration of the postcolonial issues so central to the trilogy.

In the service of a fully politicized reading of the trilogy, Jameson's approach to its "hard" scientific passages needs to be supplemented by an acknowledgement of the discursive relationship between science and colonialism, and Albanese's identification of the connection between this relationship and the polarization of science and literature, of "hard" and "soft" knowledge. Specifically, I will argue that Robinson, working within a simultaneously "hard" and "soft" discourse, is able to point towards a form of knowledge that does not rely on the hard/soft binarism. Certainly, the "pocket disquisitions" on scientific and technical knowledge which pepper *Red Mars* are recognizably "other" to its "soft" narrative of politics and personality—it is this alterity which leads Gribbin to equate these passages with "the NASA manuals." As the trilogy continues, however, it is increasingly evident that the passages of scientific description are anything but "other" to the political (and personal) dilemmas which face the colonizers. Focussing particularly on the character of Sax Russell, Robinson's symbol of 'hard,' objective science, I will suggest that the gradual but momentous change in scientific attitude and practice displayed by this character can be read as the working through of a utopian vision of science—the kind of "successor science" that, according to feminist critics, is increasingly necessary.³ This successor science, I will suggest, is based on a desire to accept the agency of the other—to nurture what Barbara McClintock has termed "a feeling for the organism" (qtd. in Keller 201).

In the Mars trilogy, Robinson develops the relationship between science and colonialism on a symbolic level through his use of tropes of colour. His narrative is shaped by what, borrowing a term from

quantum theory (itself arguably an area of “softness” —of uncertainty and observer subjectivity—within the “hardest” of sciences), we might coin his “chromodynamics.” Physicists use this term to refer to that characteristic of quarks (the most fundamental of subatomic particles) associated with the strong force and termed, arbitrarily, ‘colour.’ Quarks, like Mars, can be “red,” “green,” or “blue.” The reason that I find “chromodynamics” an enabling metaphor here is that this theory states that a quark cannot exist alone, but only in combination with other differently coloured quarks, as a component of another type of elementary particle, a hadron. A hadron such as the proton must consist of three quarks whose combination is “colourless” or “white.” To produce ‘white,’ each of the three quarks must be a different ‘colour’: one “red,” one “green,” and one “blue.”⁴ Quantum chromodynamics thus insists that “colours” must always be combined, must always exist in concert, but combinations can change, can interact dynamically.

In the following I will argue that, while Robinson uses the colour (or rather non-colour) “white” to represent science symbolically, his is a whiteness very unlike that proposed by Aldiss. For Aldiss, whiteness seems to symbolize a desire to see blankness or emptiness—scientific objectivity and autonomy—where in fact there exists a blurred spectrum of motives, prior agendas, histories, politics, and personalities. For Robinson, a true utopian science must acknowledge these “coloured” perspectives and maintain them in a dynamic union. In his first novel following the Mars trilogy, *Antarctica*, Robinson explicitly challenges (while acknowledging the lure of) the notion of a pure white “continent for science” unspoiled by politics.⁵ Similarly, the Mars trilogy explodes the notion of a “planet for science.” The trilogy is not a dry sample of hard sf on the level of “the NASA manuals,” but rather an attempt to make the coloured—the politicized—nature of science apparent, not in order to obliterate or ignore it, but to suggest a utopian chromodynamics.

I Red and Green

Perhaps the most striking feature of the planet Mars as a site for a postcolonial narrative is the absence of indigenous life. At first glance, this might seem a convenient simplification, an avoidance of an

essential issue of postcoloniality. A different view, however, is enabled by Albanese's observation that "the textual embodiment of the New World [...] is the discursive counterpart of [the] state of nature: the condition of possibility for the emergence of 'science'" (6). One strategy of colonial discourse, she suggests, is to naturalize the colonized, to place the colonized in the same relationship to the colonizer as the natural world is to the scientist. Thus Robinson's emptying out of the site of colonization could be read as a literalization of this naturalizing impulse, an attempt to make the isomorphism of the colonial and scientific impulses explicit.

This emptying out is also, of course, a standard strategy of the utopian text. Jameson recalls the "structural precondition of that social 'blank slate' upon which traditional utopias wrote their text: the radical separation of Utopia from historical reality." Jameson notes, however, that in the Mars trilogy, "this gesture remains suspended and incomplete," and "the attempt repeatedly to begin History over again [...] is the very subject of the work (227)." At one point in *Red Mars*, the unknown narrator muses on the "inertia" of history, and wonders what acceleration would be required to escape its gravity well (68). One aspect of this history, which must be both escaped and repeated, is the colonialist impulse itself; another is conflict arising from racial and cultural differences. The initial cold-war stand-off between the Russian and American members of the First Hundred colonizer-astronauts is soon replaced by a fracturing into myriad political, religious, and racial groupings, as the various waves of immigrants arrive. Robinson is unafraid to show the perpetuation of various Terran racial stereotypes: Arab assassins; the inscrutable Japanese mystic (Hiroko Ai); the Russian anarchist (Arkady Bogdanov); the moody and passionate Russian beauty (Maya Toitovna); the heroic American astronaut, charismatic, confident, and idealistic (John Boone), and his counterpart, the unscrupulous American political operator (Frank Chalmers). Inevitably, with these stereotypes comes the continuation of racial and cultural conflict. Initially, this conflict exists between the multifarious immigrants on Mars, but it soon expands to interplanetary dimensions. And while the second-generation "natives" of Mars seem idealistically tolerant of their own ethnic differences, this

tolerance comes at the expense of the othering of Earth/Terra itself, and a consequent hostility to Terran society and Terran immigrants, as indicated by the rise of the “MarsFirst” party.

The inescapable question central to this narrative is how to cease repeating the mistakes of the past, how to recognize and then to escape conflicting colours and move to a new synthesis, how to escape the inertia of history. The characters in the Mars trilogy are constantly trying to avoid comparing their situation with other revolutionary situations—the American War of Independence (a conflict symbolized by Red and Blue), the Russian Revolution (symbolized by Red and White), the whole history of revolutions. The Martians realize, furthermore, that the economic inequality that is engendered by capitalism is not separable from postcoloniality. The pragmatic Frank Chalmers points out to an Indian and a Chinese delegate to the first Martian conference that their need for land and resources on Mars is a result of “resources that were taken from you without payment during the colonial years.” When the Indian delegate remarks that “in a very real sense the colonial period never ended,” Frank replies, “That’s what transnational capitalism is: we’re all colonies now” (*Red* 460). As metanationals become more powerful than countries on Earth, effectively subsuming the governments of third-world nations, the discourses of capitalism and postcolonialism begin to blur. It is this dual heritage that the Martians want desperately to escape. Yet Maya, the Russian cosmonaut who co-captained the original voyage of the First Hundred, is (in her genetically prolonged old age) haunted by a sense of *déjà vu*, fearing that the second Martian revolution will merely repeat the violence and chaos of the first. History appears inescapable: “the present was a kind of past as well” (*Green* 672, 673). All the novels deal with people striking out for new territory, both physically and politically, determined not to repeat the mistakes of the past; but how is this possible, if striking out for new territory is a mistake of the past?

In Robinson’s exploration of possible answers to this question, science plays an integral role. In *Red Mars*, the long passages of scientific and technological description may initially appear a respite from the political and personal intrigues of the colonizers. Certainly, they do appear

to fulfil this function for the scientist characters such as Sax, Ann, and Nadia. Nevertheless, as the narrative continues, it becomes clear (as I will show) that this fulfillment is itself escapism based on naïve views of science. The increasingly complex understanding of scientific practices and attitudes developed throughout the trilogy intertwines with the continuing socio-political struggles, and the search for a synthesis of scientific approaches is interdependent with the search for a synthesis of political, racial, and cultural views. This interdependence is inevitable, given that Martian science and Martian politics are primarily concerned with ways of encountering the other, whether this be data, a planet, or a people.

The interdependent narratives of postcolonial and scientific development in the trilogy are best characterized by the ongoing conflict, stretching the length of the trilogy, between the scientists Ann Clayborne and Sax Russell. It is Clayborne, the appropriately named geologist, who immediately laments the intrusion of humanity into the radically alien, radically beautiful Martian landscape: “Mars will be gone and we’ll be here, and we’ll wonder why we feel so empty. Why when we look at the land we can never see anything but our own faces” (*Red* 190). Ann’s desire is to read the planet’s own history from its landscape and geological formations, “to read it like a text, written by its own long past” (*Blue* 98). She recognizes the impulse of the colonists to ignore this autonomous history and to recreate the colonized landscape in their own planet’s image: to “terraform.” Although Ann refuses the stereotypical colonial tropes, scorning as absurd “such simplistic analogies as [...] the woman as planet,” she does recognize terraforming as a form of bodily penetration, figuring the frozen oceans tapped from Mars’ aquifers as “semen” (*Blue* 264-65). Thus Ann promotes a kind of ecofeminism, based on an appreciation, scientific and political, of “otherness.” Because she sees this otherness constantly disregarded, written over, subsumed into sameness, she realizes that political activism is a necessary part of her scientific practice.

While Ann’s position is ostensibly a politicized resistance to the colonialist impulses of science, it can also be read as a trust in the fundamental disinterestedness of science of the same kind Aldiss professes

when he demands a “planet for science.” Ann engages in a subtle form of doublethink in which she resists the impulse to view Mars as a mirror of Terran concepts and concerns, and yet is unable to see that in order to “read it like a text” she must submit it to these concepts and concerns. This becomes evident in her first major argument with Sax Russell, the stereotypically unemotional physicist, who emerges as one of the main advocates for terraforming, the Green who opposes Ann’s Red:

“The beauty of Mars exists in the human mind,” he said in that dry factual tone, and everyone stared at him amazed. “Without the human presence it is just a collection of atoms, no different from any other random speck of matter in the universe. It’s we who understand it, and we who give it meaning. [...] All those dumb sci-fi novels with their monsters and maidens and dying civilizations. And all the scientists who studied the data, or got us here. That’s what makes Mars beautiful. Not the basalt and oxides.” (*Red* 212)

Sax’s point is that science, like literature, constructs Mars to the same degree as the giant bulldozers and air miners with which the colonizers build their early settlement. Mars is already written-over: by scientists, such as Giovanni Schiaparelli, who endowed its landscape with a hotchpotch of classical, religious, and mythological names, “a horrendous mishmash of the dreams of the past” (*Green* 155), and also by the sf writers whose names Robinson inscribes in his landscape, as they inscribed the Martian landscape in their texts. Mars was in the constant process of being both read and written over, before the terraforming even began: planet as palimpsest.

Ann, temporarily defeated by this argument, is only able to repeat her belief that humanity must concentrate on “fitting into” the universe rather than “turning it all into a mirror image of us” (*Red* 214). For Ann, Mars “is *its own place*” (*Red* 56). As the trilogy continues, around this belief spring up unidentified myths, such as that of the “little red people” (as opposed to the “little green men”). These mythical indigenes of the planet have their own name for Mars, “*Ka*” (in some dialects, “*m’kah*”), which, strangely, is echoed throughout many human

languages: “*it may be that the planet itself suggests the sound in some hypnotic way that affects all conscious observers, whether standing right on it or seeing it as a red star in the sky. [...] maybe it’s the colour that does it*” (*Green* 345-46). For Ann and her Red followers, Ka, the Red Planet, is a transcendental signified, an originary text, existing before and separate from human language and knowledge. Her despair becomes complete in the failed revolution of 2061, in which saboteurs flood the landscape by exploding aquifers: “The landscape itself was now speaking a kind of glossolalia,” its stark redness replaced by a “white noise of despair” (*Red* 638, 654). She lives to see her position parodied when, in *Blue Mars*, her cause is taken to extremes by a younger generation, “religious fanatics [...] members of some kind of rock-worshipping sect” (27).

The argument between Sax and Ann is itself inscribed into the history of the planet, their opposing viewpoints becoming known as the “Russell program” and the “Clayborne position” (*Red* 202). The ensuing struggle between the Reds and the Greens, as they battle not only each other but a third postcolonial force, the exploitative Terran metanationals for whom “Mars is not a nation but a world resource” (*Red* 602), useful only as a source of minerals and a sink for Earth’s overflowing population, becomes the framework around which the narrative is built. Complicating this standoff is the mysterious figure of Hiroko Ai, biosphere engineer, whose support for the Greens is not pragmatic but mystical, built around the concept of a life-force or “viriditas” which must manifest itself throughout the universe. For Hiroko, the altering of Mars’ atmosphere and surface is not terraforming, but rather “areoforming,” a Gaia-like process in which the planet and its inhabitants evolve together, “*a complex communal response, a creative self-designing ability*” (*Green* 13).

These main advocates of a coloured Mars, Ann (the Red), and Sax and Hiroko (the Greens), all begin the novel as scientists—scientists hand-picked to be part of the First Hundred, an elite scientific and diplomatic team. It is through the development of these characters, and in particular the working through of the longstanding impasse represented by Ann’s Red and Sax’s Green, that Robinson points the way towards an anti-colonialist ethos based on a new kind of science. Ann and Hiroko,

ecofeminists divided over their attitude towards colonialism, are both opposed to the ultra-reductionist scientism represented by Sax, the particle physicist, the most stereotypical of the scientists.

In a trilogy in which each central character represents a particular value system, Sax is very clearly “the embodiment of the spirit of science” (*Blue* 193). He is mild, unemotional, and inexpressive, “as impassive as an owl, blinking as he looked over the readouts on the room’s computer screens” (*Red* 45). His fellow-colonizers consider him a “parody of the scientist,” and joke that his brain has been replaced by “the sum of a hundred hyperintelligent rats” (*Red* 286). Sax is filled with the desire for intellectual exploration and expansion, as his conversation with the psychologist Michel makes evident:

[Michel:] You conceive of science as nothing more than answers to questions?

[Sax:] As a system for generating answers.

And what is the purpose of that?

... To know.

And what will you do with your knowledge?

... Find out more.

But why?

I don’t know. It’s the way I am. (*Green* 502)

In his belief in exploration for its own sake, and also in his refusal to acknowledge any intrusion of values into his scientific research, Sax is ironically close to Ann, although he sees their positions as antithetical. When Sax realizes that Ann deliberately conceals scientific data to protect the planet, he interprets this as a sign of the distance between them: “Concealing data: he was shocked, she could tell. He couldn’t imagine any reason good enough to conceal data. Perhaps this was the root of their inability to understand each other. Value systems based on entirely different assumptions. Completely different kinds of science” (*Red* 649). But the difference between Ann’s and Sax’s positions is not absolute at all: both allow for the entry of politics into science at one stage while denying it at another. Ann understands that science in practice is inevitably infused with political motivations, but cannot see that even in the

abstract science constructs—and therefore colonizes—what it examines. Sax admits this latter point, but supports (at least initially) an idealized view of scientific practice as objective and untouched by personality or politics.

This seemingly slight divergence of Ann's and Sax's conception of science expands into fiercely opposed campaigns involving different gender politics and different attitudes towards postcolonial ethics. Ann sees the colonization of Mars as an invasion of the body; Sax enacts this invasion by supervising the drilling of moholes, enormous holes penetrating deep into the planet's interior, designed to release geothermal (or rather areothermal) heat into the planet's atmosphere. For Ann, the physical "mastery" of nature precludes its intellectual "mastery"; for Sax, these two forms of dominance go hand-in-hand. For Ann, the planet is its own place; for Sax, "The planet is the lab" (*Red* 312).

II Green and White

The Mars trilogy, then, revolves around the ethics of exploring, colonizing, and changing a landscape void of human life, and an ethics based on science alone produces an impasse: the conflicting "Russell program" and "Clayborne position," the green and the red. However, the narrative does offer a means of moving beyond the terms of the Russell-Clayborne debate by pointing towards a rapprochement between science and another value system, and this rapprochement is symbolically suggested through chromodynamics.

The movement towards this rapprochement begins in the second novel of the trilogy, *Green Mars*, in which Nirgal, a Martian native and son of Hiroko who is brought up in a biosphere contained within an ice cave, sees the world in terms of "the green" and "the white." Throughout *Green Mars*, many binary pairs accrete around these colours, including life and death, animate and inanimate, animal and human, and, in the view of the psychologist Michel, "the Mystic and the Scientist." What is needed, according to Michel, is "a combination of both, which we call the *Alchemist*" (*Green* 27). Michel's words foreshadow the narrative: *Green Mars* describes not just the greening of Mars, but also the greening of Sax Russell, "the current living avatar of the Great Scientist" (*Blue*

193). When Sax arrives on Mars, his one interest is terraforming the planet for human habitation, even if this must be done surreptitiously. In this utilitarian approach, he is not unlike the eighteenth-century explorer-scientists whom David Mackey describes in his *In the Wake of Cook*: “They were natural scientists, and the plants, animals and rocks which were the objects of their study, were evaluated in terms of their raw material potential. To such men it was axiomatic that overseas territories should provide sustenance for the rapidly expanding industries of England” (194). By the beginning of *Blue Mars*, however, Sax has undergone something of a conversion. Three experiences catalyze this change. The narration of each experience includes “pocket disquisitions” on science, but here it is clear that these disquisitions represent not merely the trappings of hard sf, but rather an attempt to show the reader alternative scientific visions.

The first steps towards Sax’s conversion are described in the fourth section of *Green Mars*, tellingly entitled “The Scientist as Hero.” It relates Sax’s decision to emerge from the First Hundred’s underground hiding place with a new name and, thanks to plastic surgery, a new face, to continue his terraforming work. As the gregarious, relaxed Stephen Lindholm, Sax is forced to explore new dimensions of his personality. In his assumed position as a botanist, he is required to concentrate his somewhat dilettantish intelligence on a narrow range of plant life. In a scene heavy with symbolism, Sax encounters for the first time his botanical namesake, Saxifrage, “Rock breaker” (*Green* 222). Sax’s very name suggests simultaneously the greening of the rocky red landscape, and the remote possibility of a move beyond this: the Arctic Saxifrage ends in “small pale blue flowers” (*Green* 223), and the word “sax” itself suggests the colour of peace (Saxony blue or saxe blue). Through this and similar experiences, Sax seems to come to some understanding of what Hiroko calls “viriditas.” He begins to *see* differently: “And it occurred to him that this vision was not a matter of accident [...] but the result of a new and growing conceptual understanding of the landscape.” He thinks of Kuhn, and realizes that he and Ann work within incommensurable paradigms: that the Mars he saw “was a function of what he believed, and what he wanted—it was *his* Mars, evolving right before his very eyes,

always in the process of becoming something new” (*Green* 242). The physical world for Sax becomes, at this point, something more than a problem to be solved.

Not long after this, Sax, as Stephen Lindholm, attends an annual conference on terraforming. Here he is “supremely in his element” (*Green* 255). A scientific conference, for Sax, is like “a world outside time and space, in the imaginary space of pure science, surely one of the greatest achievements of the human spirit—a kind of utopian community, cosy and bright and protected. For Sax, a scientific conference *was* utopia” (*Green* 269). To Sax’s horror, however, as the conference wears on, “science began to drift into politics” (*Green* 271), with the employees of various transnational projects each advocating a position indirectly supporting the relevant project. He is pained to see “science twisted so blatantly” (*Green* 272). It is a reasonably short step for him to see that science, like the Martian landscape, is always-already “corrupted” by human politics.

The second experience which pushes Sax towards this realization is his capture and torture by the transnational forces, during which he sustains brain damage. As part of his rehabilitation, he talks at length with the psychologist, Michel, outlining his view of science quoted above. Michel replies by suggesting a different conception of science:

We disagree. But either way, the scientist’s job is to explore everything. No matter the difficulties! To stay open, to accept ambiguity. To attempt to fuse with the object of knowledge. To admit that there are values shot through the whole enterprise. To love it. To work toward discovering the values by which we should live. To work to enact those values in the world. To explore—and more than that—to create!

[Sax:] *I’ll have to think about that.* (*Green* 506)

Sax is clearly true to his word, because, toward the end of the novel, he emerges as a powerful force for the supporters of Martian independence, using his scientific skills in a targeted way to achieve political goals. He organizes the defence systems that enable the second Martian revolution

of independence, and, in the third novel, he negotiates a compromise between Green and Red wishes regarding terraforming, and he makes a trip back to Earth in order to mediate the relationship between the colony and the “mother” planet. It is as though, having realized that science is inherently political, he also sees that he must use his science politically.

The third incident occurs when Sax, exploring the botany of the Martian landscape, becomes separated from his vehicle in a white-out (snow-storms being one of the results of his own terraforming project), and is rescued from death (and his vision of whiteness, of “pure” objective science) by the brief emergence of Hiroko, who has been presumed dead or in hiding. After this surreal, perhaps hallucinated, encounter with life-saving Green within a deathly white landscape, Sax experiences a surge of optimism; he feels as he felt when recovering from his brain damage, “as if sections of his brain were actively growing—the limbic system, perhaps, the home of the emotions, linking up with the cerebral cortex at last” (*Blue* 79). Later, watching a number of “[s]mall white rodents, sniffing around on the green of a sunken meadow,” he interprets the scene symbolically as the release of the hundred lab-rats making up his brain: “Sax’s mind, now free and scattered” (*Blue* 700). Scientist and Mystic, white and green, begin to merge in Sax, symbolizing the movement from a reductionist, ultra-rationalist science to one which appreciates “the peculiar symbolic logic of the limbic system” (*Blue* 49).

III Utopian Chromodynamics

Science, then, is an integral component of Robinson’s utopian vision in the Mars trilogy, but not science as traditionally conceived and practised. Robinson’s utopian science requires the openness to the “other” advocated by Michel, and the political self-awareness eventually realized by Sax. Sax’s pre-conversion conception of the scientific conference as utopia is destroyed when he recognizes the ubiquity of political motives and perspectives. Yet even if this were not the case, Robinson suggests—even if a pure white “continent/planet for science” were possible—this would not constitute utopia. According to Arkady Bogdanov, the socialist activist who combusts towards the end of *Red Mars*, a scientific

research station “is actually a little model of prehistoric utopia, carved out of the transnational money economy by clever primates who want to live well” (*Red* 402). Because this utopia is an island of order which feeds off the chaos of the surrounding dystopia of twenty-first-century Earth, it doesn’t represent “a true utopia” (*Red* 403). For this reason, Arkady urges his colleagues to remake Martian society: “We are the first Martian colonists! We are *scientists*! It’s our *job* to think things new, to make them new!” (*Red* 81). By the beginning of *Blue Mars*, Sax has taken up his catch-cry, urging Ann to “take history by the arm and break it—*make* it. Make it new” (34).

Arkady’s view echoes feminist calls for a “successor science.” Can Sax’s conversion to Michel’s way of seeing suggest the possibility of this new kind of science, a science which would temper its urge to explore with an appreciation of value and a need to “fuse with the object of knowledge,” to use Michel’s phrase quoted above? This wording is certainly closely aligned with the kind of science that Evelyn Fox Keller describes in her biography of the cytogeneticist and Nobel Laureate Barbara McClintock, in which McClintock suggests that the scientist must achieve “a feeling for the organism.” This corresponds to “[a] deep reverence for nature, a capacity for union with that which is to be known,” attributes which “reflect a different image of science from that of a purely rational enterprise” (Keller 201). McClintock’s science is one which insists on an openness before the material of study, a willingness to “hear what the material has to say” (198); an acceptance of its “otherness.” This reverence is akin to a “form of mysticism—a commitment to the unity of experience, the oneness of nature, the fundamental mystery underlying the laws of nature.” According to Keller, rationalism and mysticism—the white and the green—both underpin scientific history and practice (201).

The physicist Sax, originally the model of the ultra-rationalist, unemotional, masculinist scientist, ironically emerges in *Blue Mars* with a “feeling for the organism.” He learns to practise the kind of science that values its objects’ own separate existence as well as the acquisition of knowledge about these objects. In this sense, he not only merges his “white” with Hiroko’s “green”—her mystical appreciation of all life—

but also with Ann's "red"—her appreciation of the otherness of all objects, living and dead. It is only fitting that these two aged enemies, Ann and Sax, should become lovers by the end of the trilogy, each publicly expressing the other's original political viewpoint, both living "[o]n a brown Mars of some new kind, red, green, blue, all swirled together," both learning how to experience "life with the other" (*Blue* 779, 735). Robinson's wording here—"the other" rather than "each other"—is telling. Sax's conversion represents not only a personal reconciliation with Ann, but also a move towards a science that refuses the colonial and patriarchal impulse to naturalize and objectify the other.

This merging of colours does not, of course, automatically guarantee a harmonic solution to the trilogy's myriad political and ideological conflicts. The point of Robinson's chromodynamics is that it produces a dynamic, not a static, union. Discussing the brownish colour which results from a red-green mix, unnameable on Sax's colour chart, Jameson suggests that

we should not exaggerate the narrative temptation to reconcile these positions in some final, ideological 'happy ending': it is true that something analogous is acted out on [the] symbolic level of color. [...] But the name for this unnameable color is Utopia, which stares insistently back at us from the *Mars* trilogy just as it does at Sax. The utopian text is not supposed to produce this synthesis all by itself, or to represent it: that is a matter for human history and for collective praxis. It is supposed only to produce the requirement of the synthesis, to open the space into which it is to be imagined (224-5).

The trilogy itself warns against easy harmonies: late in *Blue Mars*, Sax and Maya meet regularly to watch the sunset, using the colour chart to find (or, if necessary, create) names for the various combinations of colours they see. While the scientific chart insists that red and green "cannot be perceived simultaneously as components of the same colour," Maya's colour wheel provides names for red-green mixes. Maya notes, however, that politically the union of red and green has occurred only in order to produce another opposition, the Reds joining with the Green "Free

Mars” party to form an anti-immigration coalition, a united attempt to prevent further immigration from the increasingly crowded Earth. This action, Maya predicts, will lead to war on an interplanetary scale. Ironically, when Maya and Sax at last see a pure, immediately identifiable colour, it is “blue, sky blue, Terran sky blue” (*Blue* 672-73). The utopian vision returns the colonists to their centre and origin, Earth. It seems that history is not so easy to escape: the possibilities for conflict and peace in the solar system merely repeat the possibilities on Earth; or more optimistically, the possibilities represented by Robinson’s narrative of Mars in the future are possibilities achievable in the here and now.

Thus, while Robinson’s chromodynamics point to a possible utopian synthesis—of objective and subjective, science and literature, rationality and mysticism, habitation and conservation, unity and “otherness”—it is not an easy synthesis. The reader is unsure just what kind of science will be politically responsible, will abjure the patriarchal and colonialist discourse and practice which have marked it since the Renaissance. Robinson is no more able to describe in detail the nature of his “successor science” than is Harding or Keller. What he can and does do is make his readers experience different kinds of science, and more broadly knowledge systems, on the level of symbolism, of tropes of colour, and also in the actual reading process. The long, painstaking descriptions of the physical world, presented alternately with equally painstaking descriptions of socio-political conflicts and negotiations themselves, represent a dialectical process, an attempt to rethink the “othering” of literature, and more broadly of “soft” or subjective knowledge, through which science initially defined itself. Gribbin, in his description of Robinson’s novels as “all science and no fiction” reveals the same blinkered vision as Aldiss when he insists that Mars remain a pure white “planet for science.” The Mars trilogy represents a utopian escape, not from Earth, but from this monochrome vision.

Notes

- 1 These include, in addition to those publications mentioned in the text, popularizations such as John Brandenburg and Monica Paxson’s *Dead Mars*, *Dying Earth* and Robert Zubrin and Richard Wagner’s *The Case for Mars*:

The Plan to Settle the Red Planet and Why We Must, and novels such as Jack Williamson's *Beachhead*, Frederick Pohl's *Mining the Oort*, Greg Bear's *Moving Mars*, Ben Bova's *Mars* and *Return to Mars*, scientist-popularizer William Hartmann's *Mars Underground*, Gregory Benford's *The Martian Race* and Larry Niven's *Rainbow Mars*.

- 2 *White Mars* appears to have been written at least in part as a response to the Mars trilogy, as Aldiss inscribes Robinson's name into his planet ("K. S. Robinson Avenue" [75]) in the same way that Robinson acknowledges his own forebears.
- 3 I am indebted here to Robert Markley, whose discussion of Sax's "emergence as a symbol and practitioner of a science committed to the ethical imperatives of viriditas and eco-economics" lead me to focus on this aspect of the trilogy (790).
- 4 This is true of the group of hadrons termed "baryons"; a second group, termed "mesons," consist of two quarks. In a meson, a quark of a particular colour is combined with an anti-quark, which carries the relevant anti-colour (e.g. a "blue" quark will combine with an "anti-blue" anti-quark), again to form "white."
- 5 In the Mars trilogy, Robinson continually draws comparisons between the landscape and conditions in the Antarctic (particularly the Dry Valleys) and those of Mars. There is not space enough here to discuss *Antarctica*, but even a casual reading will reveal the extent to which this novel explores the recurring issues of the trilogy: the interconnectedness of science and colonialism, and the possibility of a utopian solution based on a merging of science and mysticism.

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