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## Ecocriticism and Terraforming: Building Critical Spaces

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Science fiction employs a distinctive language to engage speculatively yet critically with our contemporary world. Space, with its discrete planetary bodies and other cosmic objects, functions both as an emblem of science fiction and operates in a more general sense as a space in which to map social, ideological and ontological boundaries between cultures and between humanity and the universe. This is especially evident in narratives of terraforming. They engage with climate change and environmental philosophy and bring these discourses into contact with a postcolonial geopolitics that is reflected upon through the colonisation of other worlds. Science fiction makes use of plausible representations of science to build spaces on separate worlds where these issues can be confronted and alternative socio-political configurations entertained. This dynamic can be seen at the intersections between ecocritical and postcolonial theory in Kim Stanley Robinson's acclaimed *Mars* trilogy, comprising *Red Mars*, *Green Mars* and *Blue Mars*. In order to highlight the critical spaces put into play and the distinctive contribution science fiction makes to these issues, my point of entry will be the language of science fiction. I examine the megatextual trope of terraforming and the significance of Robinson's development of this motif before analysing specific chronotopes and the values connected to them. I then consider Edward Said's discussion of space and the Other to ask how Robinson's *Mars* trilogy operates as an exploration of dialogised spaces concerned with imagining socio-economic issues from ecocritical and postcolonial perspectives. First, however, I begin by considering M.M. Bakhtin's concepts of the chronotope and dialogism alongside Damien Broderick's notion of the science fiction megatext.

In "The Bakhtinian Road to Ecological Insight" Michael J. McDowell identifies a wider cultural shift in which 'the twentieth century has seen the hope for absolute, discrete facts disappear, to be replaced by Einstein's theory of relativity, by quantum mechanics, by Heisenberg's uncertainty principle, by chaos theory, and by such sciences as ecology' (McDowell 371). Science fiction, too, has responded to this shift in direct ways, often incorporating these sciences within a speculative frame to critically examine the ontological and cultural assumptions that provide foundations for the theme of community. M.M. Bakhtin's concepts of the chronotope (a term borrowed from the mathematics underlying Einsteinian physics) and of dialogism are congruent with Broderick's megatext on many levels, offering ways to consider the ecocritical aspects of these texts. The chronotope directs our consideration to the representation and the use of space and time in literature. These are essential concepts not only for science fiction, which builds on a scientifically informed notion of spacetime, but also to ecocriticism, which is concerned with human

relationships to natural and urban spaces, evolution and ecology. Bakhtin summarizes the chronotope as follows: '[w]e will give the name *chronotope* (literally, "time space") to the intrinsic connectedness of temporal and spatial relationships that are artistically expressed in literature' (Bakhtin 84). I argue in this paper that the language of science fiction allows writers to construct imaginative spatio-temporal worlds and to subject these worlds to a critical negotiation in which these ecocritical themes are interrogated. More specifically, terraforming itself is both a motif and a narrative form that allows this movement to be represented and these issues to be raised. I will consider terraforming generally before proceeding to an examination of specific chronotopes in Robinson's *Mars* trilogy.

Terraforming is the adaptation of planetary environments to enable human habitation. The November 2007 terraforming issue of the science magazine *Cosmos* describes it as an ambition entailing significant economic and social repercussions, making it relevant to two contemporary social issues: geopolitics and climate change. Michael Dumiak highlights the relationship between the terraforming of other worlds and the biospheric changes occurring on earth when claiming that '[t]erraforming Mars is basically a radical application of human-induced climate change' (62). Further reason to explore specifically science fictional considerations of terraforming is that these articles contain many references to science fiction and specifically to Robinson's *Mars* trilogy, which is evidence that it is a literature and language that significantly influences the language in which popular science is communicated (Lovett 58).

Of further interest from an ecocritical perspective is the magazine's cover image depicting a Mars to be terraformed; it combines the American Pastoral's imagery with that of science fiction, providing a contrast between the familiar, here an enclosed American suburban space, and the alien landscape of Mars, thus indicating the persistence of a series of technological and socio-political discourses associated with the American Dream. Drawing on Samuel R. Delany, Broderick outlines the concept of the science fiction megatext in his book *Reading by Starlight*. He argues that for the initiated reader the icons of science fiction, such as the spaceship, robot or terraforming itself (made up of a number of constituent icons), have been developed dialogically over the history of the science fiction tradition. Because of this dialogism, megatextual tropes potentially signify far in excess of their sense or reference than when they are decoded against non-science fictional traditions. This is important because decoding science fictional texts against the megatext offers ways to examine the contribution each one makes to the wider debate regarding the relationship between human and non-human space in science fiction discourse. Applying this decoding practice to the cover allows us to consider the image as part of a science fictional world with its own socio-economic relationships. The cover depicts a man returning home to his wife and two children, a boy and girl, recalling the idea of the 1950s American nuclear family. But its location on the surface of

Mars and a quote from an article in the magazine by Buzz Aldrin, where he says "[t]he time has come to expand our horizons, and the next obvious step is Mars" (*Cosmos* cover), recalls the 1960s moon landings and the associated discourse of exploration and colonisation. 1950s to 1960s America, specifically that lifestyle associated with the American Dream, is simply transplanted to the surface of Mars with only superficial changes and additions to acknowledge the landscape: a Martian rover instead of a car, a spacesuit instead of a suit (although the man does carry a briefcase) and an airlock and dome. This image recalls those American science fiction narratives in which colonisation is seen as an extension of the same values present in contemporary culture at the time of publication, although many texts<sup>1</sup>, including Robinson's *Mars* trilogy, also respond to this trend by reflecting upon it critically.

Robinson's *Mars* trilogy is a contemporary classic of science fiction. Through three seven hundred page novels and an associated volume of short stories and poetry titled *The Martians* it relates in detail the terraforming efforts of, initially, a group of one hundred scientists known as the "First Hundred", then the following influx of settlers from Earth and the Mars born generations. The text draws from the hard science fiction tradition when narrating in plausible terms the science driven terraforming project from the point of view of the scientists, which foregrounds the debate between practitioners of a range of disciplines, most notably geology, ecology and evolution. This is portrayed in sequences of discussion as the scientists begin the uncertain process of constructing a new way of living on Mars. Glen Love, in his *Practical Ecocriticism*, states in his introduction that as critics concerned with the environment '[w]e have to keep finding out what it means to be human. And the key to this new awareness is the life sciences' (6). By 'life sciences' he means those disciplines and concepts, such as ecology and evolution, that are grounded in biology. This is a position that parallels critic Brian Aldiss's definition of science fiction in his history of the mode, *Trillion Year Spree*: '[s]cience fiction is the search for a definition of mankind and his status in the universe which will stand in our advanced but confused state of knowledge (science)' (4). He goes on to claim that '[t]he greatest successes of science fiction are those which deal with man in relation to his changing surroundings and abilities: what might loosely be called *environmental fiction*' (Aldiss 8). This attempt to define humanity connects ecocriticism and science fiction and suggests that science fiction is a mode ideally suited to exploring ecocritical themes. Glen Love, too, is concerned with environmental fiction, not only in the strict sense of environmental literature but in Aldiss's sense of an outlook that 'encompasses nonhuman as well as human contexts and considerations' (Love 1). Science fiction therefore shares ecocriticism's concern with the relationship between man and his environment.

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<sup>1</sup> Examples of this conscious critical reflection include Stanislaw Lem's *Solaris*, Samuel R. Delany's *The Einstein Intersection* and, implicitly, much hard science fiction such as Stephen Baxter's *Manifold* trilogy and Greg Egan's *Diaspora*.

Narratives of space colonisation in general and terraforming in particular are concerned with investigating new ways in which human communities interact with each other and their environment in new spatio-temporal contexts. Bakhtin links the theme of community closely to that of space in the following passage:

It is necessary to find a new relationship to nature, not to the little nature of one's own corner of the world but to the big nature of the great world, to all the phenomena of the solar system, to the wealth excavated from the earth's core, to a variety of geographical locations and continents. In place of the limited idyllic collective, a new collective must be established capable of embracing all humanity (Bakhtin 234).

The search for 'a new collective [...] capable of embracing all humanity' is a common science fictional theme that resonates with the utopian dimension of its discourse: Fredric Jameson draws on Darko Suvin's connection of science fiction to utopia and Brechtian estrangement to claim that 'terraforming ought to constitute the utopian moment *par excellence*' (Jameson 220). Planets such as Mars and Earth are often represented as unified spaces, which imply a global social unity. In the *Mars* trilogy Earth is forced to respond to the negative effects of global climate change, not from a national perspective, but from a correspondingly global one, as the effects of catastrophic ecological disaster impact upon all of the planet's population. The collectives Bakhtin identifies are represented as nested collections of spaces and are often associated with contesting positions that are developed throughout the narrative. For example, Bakhtin's passage resonates with the chronotope of the interplanetary mine, which in the *Mars* trilogy is connected to debates regarding the preservation of alien planets as wilderness areas, idylls in which the socio-political struggles of humanity have not yet made an impact. I will return to a discussion of this local chronotope in a moment, but first I wish to consider the planetary chronotopes of Earth and Mars in more detail.

The *Mars* trilogy portrays a not unfamiliar Earth ravaged by overpopulation, pollution, global warming, rising sea levels, war, famine and severe economic and political inequalities between the rich and poor, a list that matches Love's list of contemporary environmental problems (Love 14-15). In accordance with Bakhtin's notion of the chronotope both time and space are implicitly expressed as interrelated in a text; time qualifies spatial meanings and vice versa. The future setting of this narrative is accompanied by ecological changes to Earth's landscape, which in turn have social, political and economic repercussions. Many of the First Hundred apply for the expedition to Mars to escape these problems, others see the project as a last hope for Earth, while others go purely for the scientific opportunities it offers. The text's form foregrounds the importance of, and problems associated with, the opening up of spaces for dialogue in two ways: first, by choosing different characters' points of view for each section and, secondly, by portraying the social activity of the colonists from these alternating perspectives as they attempt to construct a

new society. This latter point involves a portrayal of the confrontations and differences of ideology between opposed groups of people or between individual points of view. The Machiavellian character Frank Chalmers recognises the importance of exchange between opposed positions when, in the opening sequence of the trilogy, he thinks: '[y]ou fool [...] talk means everything. We are nothing but information exchange, talk is all we have!' (*Red Mars* 31). His plan to gain political dominance on Mars depends upon driving a wedge between cultural groups; by playing on the historical antagonisms and divisions between Arab and American culture, he is able to hijack any attempt toward dialogue. Raising awareness and support for political positions and lifestyles is a major narrative component of the trilogy and is conducted through discussion, campaigning and interviews, reflecting the importance of information exchange. As multiple individuals and groups attempt to define the Martian landscape according to their own values, the exchange and conflict between their contesting positions establish a literary ecology in which a space for debate over the meaning of Mars is opened up. I will now discuss some of the ethical and social ramifications of one of these debates in the *Mars* trilogy, and in the process outline aspects of Earth and Mars when viewed as planetary chronotopes.

Characters in the *Mars* trilogy stand for positions in an ongoing debate. One of these central debates revolves around the Reds and Greens, labels for divergent ideological positions toward terraforming represented by the characters Ann Clayborne and Sax Russell. Ann, a geologist, believes that Mars should not be terraformed, that it should be preserved in its natural state not just because it would be invaluable for study, but because such intervention ignores the rights of the Martian landscape to be preserved as near as possible to wilderness: "'you're going to wreck the historical record, destroy the polar caps, and the outflow channels, and the canyon bottoms – destroy a beautiful pure landscape, and for *nothing at all*'" (*Red Mars* 212). Sax, a physicist turned biotechnologist and a Green, represents the interests of the terraforming project. He views life from an Earth-centric position; bringing it to Mars may end a long period of alien beauty, but life is an end in itself and is therefore an ethical goal:

Changing it won't destroy it. Reading its past might get harder, but the beauty of it won't go away. If there are lakes, or forests, or glaciers, how does that diminish Mars's beauty? I don't think it does. I think it only enhances it. It adds life, the most beautiful system of all (*Red Mars* 213).

As the trilogy progresses, these two positions splinter into a variety of mediations between these two extremes, and Sax comes to question his initial position. The setting of the text, the red planet Mars, means that the ideological connotations of green as a label for environmental consciousness is reversed, with it coming to represent the interests of an unreflecting and destructive process. That these values are those that have led Earth to its current environmental and political crisis allows us

to question further our notions of what would be acceptable for an interplanetary environmental consciousness. It also leads us to question the symbolic value of terraforming and the implication that it leads to a mirroring of the socio-political dynamics on Earth as well as that of its landscape. Space is politicised in the *Mars* trilogy as groups struggle to define its meaning and their relationship to it.

Ann and Sax exemplify the way in which language is used to speak for the Martian landscape from perspectives that view it as a site of traditional symbolic value as well as from contesting positions that overall contribute to define textual spaces for the confrontation and interaction of different discourses. Sax views Mars as lifeless and therefore ripe for the seeding of life, a traditional science fictional theme. Ann views the landscape in terms resonating with the American Pastoral, with the Martian landscape now occupying the role of pristine wilderness. These values are represented synchronically, as spaces that are placed in juxtaposition to each other: Ann and Sax embody contesting views toward the Martian landscape while Chalmers considers it as a space in which to manoeuvre for political dominance. However, through the diachronic structure of a text (narration and character dialogue), these and other positions come into contact with one another to allow an implied audience to consider and question the value systems represented. Different characters may express contesting positions toward a particular landscape that can be read against the implied authorial voice. As Sax's questioning of his initial position shows, a character may be exposed to different ideological worlds and attempt to reconcile the contrast between the discourses that these landscapes are made to represent.

The environmental ethics associated with altering landscapes calls into question the social motives for terraforming, illustrating a major intersection between ecocritical and postcolonial concerns. Mars is seen as a possible solution to the problem of overpopulation, and therefore to the problems of the ecological crisis and the violence that these tensions encourage. But the text suggests that simply turning to technology as the answer to complex problems is not enough. A break with history becomes one of the driving goals of the more politically minded on Mars, championed by the Russian Arkady Bogdanov and the American John Boone. They believe that the social patterns on Earth are responsible for many of the ills that face humanity now and that nothing but a complete overhaul will do: a discarding of those that are unhelpful and destructive, and a retaining of those that speak for cultural pluralism and a new Martian identity. John Boone, after many discussions with Arkady Bogdanov, advocates "'a new Martian way, a new Martian philosophy, economics, religion!'" (*Red Mars* 410). This call for a new outlook is one of the central ideas of science fictional narratives of terraforming, and it takes its place in an ongoing debate with other texts, most notably Isaac Asimov's "The Martian Way", in which a group of colonists on Mars manage to secure a source of water that allows them to sever themselves from dependency on

Earth. This economic independence is connected specifically to a Martian perspective in which community is emphasised in contrast to Earth's socio-political schisms, which is caused by individualistic and nationalistic perspectives toward resources and land use. The process of settling and terraforming a planet is often presented in terms of a utopian exploration of new social possibilities, an attempt to explore alternatives to destructive societal structures on Earth. The intersections between texts, between generic categories such as science fiction and utopia and the pastoral, and between motifs such as colonisation and terraforming are heteroglossic, engaging with the science fiction megatext and with contemporary discourses of environmental philosophy and geopolitics.

Science fiction therefore taps into a range of generic forms and discourses and reconfigures them through its own language in order to provide textual spaces for a consideration of human relationships to the landscape from alternative perspectives. In the foregoing discussion this is achieved by adapting the pastoral and utopian form in conjunction with portraying debate between positions to consider questions of land use and responsibility toward the land. These alternate perspectives arise from differences in physical space, from the contrast between the planetary spaces of Earth and Mars and the meaning invested in them. Local, global and interplanetary space is constituted by ecologies of spaces embodying multiple ideological positions. In this way the concept of the chronotope, as a unit for the analysis of texts, is joined to Bakhtin's theory of dialogism, which is especially important as it is the principle by which Damien Broderick's megatext operates. Dialogism and the chronotope interact to define the structure of a text; parts interrelate to take on additional layers of meaning, and changes to one dimension impact upon others. In the glossary of *The Dialogic Imagination* dialogism is described as 'the characteristic epistemological mode of a world dominated by heteroglossia':

Everything means, is understood, as a part of a greater whole – there is a constant interaction between meanings, all of which have the potential of conditioning others. Which will affect the other, how it will do so and in what degree is what is actually settled at the moment of utterance (Bakhtin 426).

The Red / Green debate discussed above and the view of technology as the solution to ecological problems on Earth are specific examples of voices that work to condition each other. Linked to the internal ecology of a text is an external one in which individual works referring to others in the same genre exist in a dialogue that contribute additional layers to the meaning of the themes and images therein, as in the example of Asimov's text discussed above. I will now proceed from the consideration of Mars and Earth as planetary chronotopes to an examination of a local chronotope, that of the colonising outpost as interplanetary mine, before returning to a consideration of global chronotopes. This will allow me to develop some of the specificities involved in the interplanetary



relationship between the chronotopes of Earth and Mars, and to explore in more detail the way in which the pastoral is incorporated into this complex of discourse.

The chronotope of the first colonising outpost in *Red Mars* implies a series of potential narrative trajectories and draws upon the pastoral opposition between images of the "natural" landscape of the country and the technological city. As noted above, Bakhtin's chronotope is the artistic representation of space and time as interconnected in literature. This representation, because linguistic, allows it to accrue a series of human-centric meanings from structures internal to the text and through the science fiction megatext, a discourse constructed by the science fiction tradition. Sax's assessment of terraforming is cast in doubt in the light of Nadia's trip with Ann to the North Polar Region. On her return, she sees their habitat in a new light: '[i]t had the disordered, functional, ugly look of Vanino or Usman or any of the Stalinist heavy industry cities in the Urals, or the oil camps of Yakut. They rolled through a good five kilometers of this devastation' (*Red Mars* 191). The description of the outpost taps into the narrative potential of the dystopia, the alternative to the possibility of a utopian interplanetary colony. This theme contributes to the ongoing debate regarding the development of new societies on other worlds. It constructs an image of a repressive society signified by the chronotope of the city as wasteland, delineating a socio-political structure that rejects a heteroglossic dialogue that can incorporate all the voices of the multiple groups who work toward constructing a new Martian identity.

This chronotope is contrasted with Nadia's vision of the Martian landscape on her journey out with Ann: '[a]ll this beauty was so strange, so *alien*. Nadia had never seen it properly before, or never really felt it, she realized that now; she had been enjoying her life as if it were a Siberia made right, living in a huge analogy, understanding everything in terms of her past' (*Red Mars* 171). Here we see the pastoral refigured: by contrasting the alien with the familiar, its strangeness is raised to the level of awareness, which draws attention to how Mars is unlike the natural landscapes we are familiar with. It signifies the new, and it is civilisation on Earth that is shifted to a nostalgic past. Nadia responds to the intuition that Mars is not solely a field for the imposition of her engineering discipline, and so overlays the chronotope of the Martian wilderness with other meanings apart from that of human use value. Not only does this episode draw on the mystique of Mars, built up, as Sax notes, from "[a]ll 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" (*Red Mars* 212), but it challenges conventional ideas of beauty and pushes us as readers to reflect on a personal, aesthetic response to a nature not already conceived of as determined by cultural expectations. This is a reflection on how, through Nadia's experiences of the "real" Martian landscape with Ann, an ecologically oriented perspective is woven into the dialogue of the text and stands out as one of its major ideological voices.

That the initial outpost is built near resources dropped from Earth, including a full range of technologies built by Boeing, Rolls Royce and other companies, indicates that the outpost itself and the terraforming effort that it leads to is driven by commercial interests from the most powerful of Earth's transnationals, a political fact that some of the First Hundred, unlike Arkady Bogdanov, would prefer to ignore: "it all comes back, and we have a return of ownership, and prices, and wages. The little scientific station is being turned into a mine, with the usual mining attitude toward the land over the treasure" (*Red Mars* 403). This draws on the science fiction megatextual trope of technological sophistication, but associates these technologies with familiar companies, implying one of the uncanny oscillations of the subjunctivity of science fiction, which Delany claims is 'blanketly defined by: *have not happened*' (44) – an unspoken "yet" may linger at the end of that sentence. Here the chronotope of the scientific station, associated with exploration and the scientific utopia, is shifted to that of the mine, an industrial, capitalist image. Driving these economic interests is the application of advanced technology as a means of securing resources with which to relieve the scarcity on Earth, thus allowing them to better cope with the growing ecological crisis there. The paradox here is that it is the historical application of increasingly advanced technology that has enabled Earth's population to boom, resulting in this depletion of all types of natural resource and the growing ecological crisis. This is further emphasised by the discovery on Mars of a new treatment that can significantly prolong human lifespan. It is predicted that this will increase the transnational's drive for economic security for two reasons: because it will exacerbate the already problematic division between the rich and poor, and because it will increase overpopulation on Earth: "if this damned treatment only goes to the rich, then the poor will revolt and it'll all explode—but if the treatment goes to everyone, then populations will soar and it'll all explode" (*Red Mars* 415). In this context Mars is seen only as a space for the resolution of Earth's eco-political problems. The view of the scientific station and of Mars as a mine represents the transnational's attempt to impose an identity based solely on use value onto the Martian landscape and its community. Because these transnationals only recognise Mars as a source for the extraction of resources to the exclusion of all other possible activity, and because they consider the scientist's role to be completely focused on this aim, their priorities for the physical adaptation of the landscape reflect an attempt to turn the planet into a mine. This is a purely instrumental perspective that reveals their consideration of the natural Martian landscape to be completely based upon Earth-centric use value. Similarly, the scientific community on the planet is also considered in terms of use value and not as individuals whose lived experience on the planet might justify alternative interpretations of the landscape.

The urge to make a break with the trajectory of reified ideology is mirrored by the narrative's discontinuity in time. Set in 2026, this near future narrative compresses the traditional

gap between the time the text was published (1992) and the far future setting of much science fiction dealing with the colonisation of the solar system. Such far future narratives imply significant changes in socio-political structures and technology, as for example in Delany's own novels and short stories and in Pamela Sargent's *Venus* trilogy, which is also a terraforming narrative. The *Mars* trilogy, however, begins by retaining much of the social and political structures that we are familiar with now and calls them into question as the trilogy progresses. It also adds further weight to the implication that the series of crises faced on Earth oscillates between Delany's science fictional subjunctivity 'have not happened' and 'have not happened yet', but may soon (Delany 44). The solution demonstrated by the focus on social relationships in a new space of socio-political experimentation asserts that it is by focusing not on changing the landscape but by landscaping the self, by metaphorically terraforming the individual and social aspects of a community, which presents the best hope for effective change. This is wrapped up with the Martian landscape itself: a phrase that appears throughout the trilogy, "[s]o we terraform the planet; but the planet areoforms us" (*Red Mars* 301) demonstrates that the landscape has a corresponding effect upon its inhabitants, that there is an influence exerted upon consciousness from an alien Nature's radical Otherness.

I return to the planetary chronotopes of Earth and Mars and their developing interplanetary relationship. As the trilogy progresses and the Martian landscape becomes green, then blue with water running free on its surface, these themes are argued over and considered from an increasing number of different perspectives and contexts. Sections of the second and third text are focalized from the point of view of the Mars born generations. Nirgal, whose name is another name for Mars, explains the importance of colonising the planet in a speech he makes while visiting Earth, which opens up a space for an alternative meaning to be associated with the Martian landscape:

"Mars is a mirror," he said in the microphone, "in which Terra sees its own essence. The move to Mars was a purifying voyage, stripping away all but the most important things. What arrived in the end was Terran through and through. And what has happened since then has been an expression of Terran thought and Terran genes. And so, more than any material aid in scarce metals or new genetic strains, we can most help the home planet by serving as a way for you to see yourselves. As a way to map out an unimaginable immensity" (*Blue Mars* 178).

Nirgal points out the structural relationship between the chronotopes Earth and Mars, a relationship that has received much attention in science fiction narratives of colonisation. In doing so he underscores a postcolonial dimension to terraforming other planets, aspects of which I have already discussed in terms of national and global identity and familiar and unfamiliar spaces. In *Orientalism*, Edward Said notes that 'there is no doubt that imaginative geography and history help the mind to intensify its own sense of itself by dramatizing the distance and difference between

what is close to it and what is far away' (Said 55). The vacuum of space, itself a chronotope symbolising a purifying transformation, signifies the radical distance between the two planets and serves as one of several estranging devices. This distance, and the imaginative geography already associated with Mars, establishes it as a field for the exploration and experimentation of alternative social and individual identities that allow Earth's population to see distorted reflections of their Self modified by influences from the Other, alien landscape, but only if it is not considered solely in terms of the chronotope of the interplanetary mine.

When applied to science fictional worlds, Said's notion of Orientalism sheds light on Ann's resistance to the terraforming of Mars, which is geared towards recreating the Self, symbolised by Earth's landscape, on another planet. Ann and Nadia's response to the wilderness of the Martian landscape is an affective response to Nature's Other, a non-human identity that remains outside of the familiar bounded spaces of the colonising outposts. Terraforming reduces these spaces of the Other to a partial identity through the growth of an ecological system imported from Earth: an ecological colonialism. This identity is partial because such imports must be adapted to the alien landscape and because any unadapted imports are subject to an evolutionary influence from said landscape. In this way the social aspect of settling on another planet and the ecologically focused terraforming project are not simply two material necessities to ensure survival on Mars, but are in fact attempts to reduce Mars's Otherness to an identity. This notion is encapsulated by the phrase "terraforming" itself, which means "Earth-forming": the colonists attempt to change the Martian landscape, which is Other from the point of view of Earth's population, into another Earth. The last phrase of the quote in the above paragraph, "[a]s a way to map out an unimaginable immensity" (*Blue Mars* 178), can be read as a reference to the importance of landscape as "hero" or "character" in science fiction as well as to the notion of a sense of wonder, a character's and (potentially) a reader's response to events which is characterised by the notion of a conceptual breakthrough, a shift in the fundamental conceptual paradigms by which we view the world. Mars's meaning for Earth, as a way to map "an unimaginable immensity", is one such conceptual shift that connects Earth and Mars. Time is the immensity referred to here; the trilogy literally spatialises an imagined future in the form of a series of novels as an attempt to address human-centred concerns that cannot be predicted from our present vantage point. In the process it acknowledges the concern that the Martian landscape seen as an Other exists independently of the interests of Earth's population. Nirgal, however, elides this aspect of Mars.

Said discusses the example of 'Bouvard's vision of Europe regenerated by Asia' which 'represents what Flaubert felt to be the nineteenth-century predilection for the rebuilding of the world according to an imaginative vision, sometimes accompanied by a special scientific technique' (Said 114). He notes that '[k]nowledge of the Orient, because generated out of strength, in a sense

*creates* the Orient, the Oriental, and his world' (Said 40). In this sense the reconstructed Other is an identity, the projected qualities of the creators, because it excludes the Other from opportunities to define themselves. The Martian landscape, Nature's Other, has no obvious voice and so is at greater risk of being spoken for. Such denial of the Other through an imposition of the Self provide foundations for the repetition of historical influences that Arkady advocates against in terms of a break from history. But this apparent mirror is mediated by the effects of the Martian landscape on the colonists, who do respond to the Otherness of Mars and adapt to it in an evolutionary way. Through the synthesis of Self and Other Nirgal offers to Earth an opportunity to regenerate themselves in a manner that resonates with Said's examination of Bouvard's (sometimes scientific) utopian vision, but that makes concessions to non-human Otherness and its importance for human social systems.

The anthropocentric use value of the Martian landscape is not the entire story; Nirgal goes on to claim that "'we have to help each other. We have to regulate ourselves, we have to take care of the land [...] First, we are an experiment in taking care of the land. Everyone learns from that, and some lessons can be applied here'" (*Blue Mars* 197). Again, this is a heavily dialogised passage that highlights the position of the science fiction text as a thought experiment allowing us to consider ideas and situations in ways different from other genres. Through the theme of another world as a space for cultural experimentation another important example is raised of how narratives of terraforming can be used to reflect upon concerns such as climate change, geopolitics and a range of other contemporary issues. This idea arises as one of the dominant meanings attached to Mars as a chronotope. Diverse groups pursue different social systems, the imbrications of which experiments construct a polyphonic whole. Heteroglossia allows these alternative explorations to be productively considered in relation to other voices within the science fiction megatext, creating a vast conceptual space congenial to a critical examination of scientific, social and ecological themes relevant to our contemporary world.

Through the motif of a new planet subjected to colonisation, terraforming and permanent habitation narratives of terraforming provide textual spaces populated by competing ideological positions. The language of science fiction, namely its use of megatextual images including chronotopes, spatialises this dialogue to allow these topical debates to mutually illuminate and question the others. The spaces of Mars, Earth, the colonising outposts and mining facilities take part in a heteroglossic dialogue in which different voices are placed in relation to each other to create a polyphonic whole which serves to structure a critical examination of man in relation to his environment. The *Mars* trilogy illustrates the way in which the meaning of these chronotopes are contested as the Martian landscape is spoken for from the position of transnationals, Greens engaging with the terraforming process and Reds agitating for the preservation of Mars as

wilderness. These debates embody the process of world-building on the social level, in which a new Martian identity, distinct from Earth, arises from the interstices of debate and from the Martian landscape's influence on them. This world building is connected to both ecocritical and postcolonial concerns and is linked to the utopia and dystopia, two alternative paths through which the development of the new society could lead. Debates over climate change and the environment are addressed through the master motif of terraforming and are directly connected to a postcolonial geopolitics that Robinson identifies and shows to be essential for consideration in order to cope with contemporary social and ecological upheavals.

## Works Cited

- Aldiss, Brian and David Wingrove. *Trillion Year Spree: The History of Science Fiction*. London: House of Stratus, 2001.
- Asimov, Isaac. "The Martian Way." *The Science Fiction Hall of Fame*. Ed. Ben Bova. Vol 2. New York: Tom Doherty Associates, 1973. 1-45.
- Bakhtin, M.M. *The Dialogic Imagination: Four Essays*. Ed. Michael Holquist. Trans. Caryl Emerson and Michael Holquist. Austin: University of Texas Press, 2002.
- Baxter, Stephen. *Origin*. London: Voyager, 2002.
- . *Space*. London: Voyager, 2000.
- . *Time*. London: Voyager, 1999.
- Broderick, Damien. *Reading by Starlight: Postmodern Science Fiction*. London: Routledge, 1995.
- Delany, Samuel R. *The Einstein Intersection*. New York: Bantam, 1981.
- . *The Jewel Hinged Jaw: Notes on the Language of Science Fiction*. New York: Dragon Press, 1977.
- Dumiak, Michael. "Turning the Red Planet Green." *Cosmos* Nov 2007: 62-65.
- Egan, Greg. *Diaspora*. London: Millenium, 1997.
- Jameson, Fredric, "'If I can find one good city I will spare the man': Realism and Utopia in Kim Stanley Robinson's *Mars* trilogy". *Learning From Other Worlds*. Liverpool: Liverpool University Press, 2002. 208-232.
- Lem, Stanislaw. *Solaris*. London: Faber and Faber, 2003.
- Love, Glen A. *Practical Ecocriticism: Literature, Biology, and the Environment*. Charlottesville: University Press of Virginia, 2003.
- Lovett, Richard A. "Mars: The Next Giant Leap." *Cosmos* Nov 2007: 53-61.
- McDowell, Michael J. "The Bakhtinian Road to Ecological Insight." *The Ecocriticism Reader: Landmarks in Literary Ecology*. Athens: University of Georgia Press, 1996. 371-391.
- Robinson, Kim Stanley. *Blue Mars*. London: HarperCollins, 1996.
- . *Green Mars*. London: HarperCollins, 1992.
- . *Red Mars*. London: HarperCollins, 1992.
- . *The Martians*. London: HarperCollins, 1999.
- Said, Edward. *Orientalism*. London: Penguin, 2003.
- Sargent, Pamela. *Child of Venus*. New York: HarperCollins, 2001.
- . *Venus of Dreams*. London: Bantam, 1989.
- . *Venus of Shadows*. New York: Doubleday, 1988.