CHAIRE de responsabilité sociale et de développement durable
ESG UQÀM

Thinking post-ecological societies with science-fiction

Corinne Gendron, René Audet et Bernard Girard

Les cahiers de la CRSDD • collection recherche
No 09-2012

Corinne Gendron est professeure au département de stratégie, responsabilité sociale et environnementale de l'École des sciences de la gestion de l'UQAM. Elle est aussi titulaire de la Chaire de responsabilité sociale et de développement durable.

René Audet est professeur au département de stratégie, responsabilité sociale et environnementale de l'École des sciences de la gestion de l'UQAM et chercheur à la Chaire de responsabilité sociale et de développement durable.

Bernard Girard est chercheur affilié à la Chaire de responsabilité sociale et de développement durable, consultant en management, chroniqueur radio, journaliste, conférencier, auteur de plusieurs livres sur le management et ses théories, la littérature et l'économie ainsi qu'observateur des nouvelles technologies depuis plus de vingt ans.

Les cahiers de la CRSDD
Collection recherche • No 09-2012

Thinking post-ecological societies with science-fiction

Par *Corinne Gendron, René Audet et Bernard Girard*

ISBN 978-2-923324-20-3
Dépôt Légal - Bibliothèque et Archives nationales du Québec, 2012

CHAIRE de responsabilité sociale et de développement durable
ESG UQÀM

École des sciences de la gestion
Université du Québec à Montréal
Case postale 8888, Succursale Centre-ville
Montréal (Québec) H3C 3P8 Canada
http://www.crsdd.uqam.ca

Summary

Facing the accumulation of data that suggest near future dramatic changes in our way of life, current visions of transition are anchored in an incremental paradigm that excludes radical change. Using Science Fiction literature and cinema, this article aims at building such drastic change hypothesis and exploring political-ecological features of future societies emerging from a rupture phenomenon. These post-ecological societies need to be imagined and analyzed in order to better prepare to eventual dramatic changes and to engage in a prospective exercise to choose a future. Our work builds on the idea that other forms of knowledge – such as artistic, creative knowledge produced in Science Fiction literature and cinema – are promising sources imagination and must be engaged in a dialogue with sociology and other social sciences in order to develop hypothesis of possible future. The paper introduces six such hypothesis called “scenarios” that were induced from the systematic study of a body of work in recent and classical Science Fiction production.

Table des matières

Introduction: challenges in thinking post-ecological societies[1]

Accumulation of environmental data tends to confirm that we will experience in the near future dramatic changes in our way of life (IPCC, 2011; Leakey and Lewin, 1995). But numerous studies analyze how our economic governance can be adjusted to take into account environmental parameters without leaving our aspirations to abundance and wellbeing (UNEP, 2011). Most of them are anchored in an incremental paradigm of transition, revision or adaptation that results in a vision of society essentially based on the same logic, social dynamic or rationality. These studies can be extremely valuable as they draw the modernization path of our societies towards a "sustainable development", but they do not suffice to understand our future. For example, Harris (1996) explains how an incremental approach to the issue of world agriculture misses the profound real challenges: "The discussion of world agricultural futures has usually been framed in a Malthusian context, with technological optimists lining up against neo-Malthusian pessimists. This is a misconstruction of the real issue" (1996, p. 112).

As Meppem recalls, "how problems are conceptualized will largely define the solutions sought" (2000, p. 48). This is why a strategy of deconstruction is necessary to open up new ways of thinking and imagining not only the solutions, but the very problems we face (p. 53). Building on the work of Mills and Polanyi, Forstater explains that the reorganization of a problem is

[1] This paper has been presented at 2012 ISEE Congress: Gendron, C. Audet R. et B. Girard. 2012. « Thinking post-ecological societies with science-fiction ». Rio de Janeiro, du 16 au 19 juin 2012. We would like to thank Karine Casault and Joubine Eslahpazir who helped in the data collection of this study, and the FQRSC Innovative program for funding of the research. Paper presented to ISEE, 2012.

a valuable heuristic tactic, where imagination can help to find new links and unsuspected connections[2] (2004, p. 28).

> Imagination is often successfully invited by putting together hitherto isolated items, by finding unsuspecting connections […] As you re-arrange a filing system, you often find that you are, as it were, loosening your imagination […]. Of course, you will have in mind several problems on which you are actively working, but you also try to be passively receptive to unforeseen and unplanned linkages (Mills, 1959, p. 201, 212, quoted in Forstater, 2004, p. 28).

In other words, we need to consider hypothesis that are neglected today because they question the basic institutions from which we define and conceptualize today's challenges. To better understand our future, in addition with incremental change forecasting, we need studies built on drastic change hypothesis that explore possible societies emerging from rupture phenomena. Post-ecological societies need to be imagined and analyzed in order to better prepare eventual dramatic changes and to engage in a prospective exercise to choose a future.

In this sense, research undertaken about sustainability often focuses on political choices to be made, and therefore engage in normative debate. As Kastenhofer et al. explain:

> The orientation towards societal action and political decisions can be seen as one central feature of any research in the context of sustainable development perspectives. If taken seriously, it should result in the formulation of specific recommendations to specific

[2] "One heuristic tactic noted by Polanyi is to continuously reorganize the problem 'with a view to eliciting some new suggestive aspects of it' (1958, p. 128). This is reminiscent of C. Wright Mills' suggestion that 'the re-arranging of the [researcher's] file … is one way to invite the [sociological] imagination (1959, p. 212)" (Forstater, 2004, p. 28).

> actors. Unfortunately, such a step partly contradicts the established scientific norms and rules. Within scientific culture and practice, a clear separation of the epistemic undertakings of scientists and the political actions, normative positions and stakeholder interests within society is of paramount importance to constantly re-affirm the boundary between the search for objective truth and the everyday hustle for power and subjective interpretations (Kastenhofer et al., 2011, p. 841).

If we might discuss the necessity that sustainability research always conduct to specific recommendations to identifiable actors, undoubtedly this area of research, maybe because of the urgency of ecological issues, is intrinsic to political debate and dynamic, as it is obvious in the climate change agenda. Therefore, we need not only to foresee the use that can be made of the results of such research by identified actors, but also to understand how the social and political context have influence the hypothesis on which they are built, and maybe try to overcome or to deconstruct the accepted scheme and innovate in order to encompass the rigidity institutions are imposing on the very formulation of the problems.

Considering the need for producing original and challenging hypothesis on post-ecological societies, and building on a hermeneutic of invention, this paper develops six scenarios inspired from science-fiction literature and cinema to think human-nature relation in post-ecological societies.

1. Hermeneutics of invention: the stimulation of imagination in sociologic studies

Some authors have pointed out the fact that actual hermeneutic systems are not necessarily good instruments to study dramatically different modern societies. Born with industrial society, sociology, for example, might not have the tools needed to understand a radically new society; its theoretical traditions do not help think such dramatically new society. Facing the enormous challenge of climate change, sociology has trouble to propose radically new hypothesis by fear of "naturalist" explanations and/or theological models (Lever-Tracy, 2008). Not that social sciences are intrinsically weak because of being too empirical or too theoretical as Mills (1959) would have stressed, but because the changes to be explored are not in continuity with actual systems. Barrère and Martuccelli (2009) note that if sociology hasn't produced what it promised, it is less because of a lack of scientificity than because of a lack of imagination which lead to a profound conservatism in its representation of the world and of social actors. Moreover, they argue that a certain ignorance of recent artistic developments might be at the source of today's difficulty for sociology to formulate new questions, as it maintains a dated vision of cultural representations of the individual and the world that prevents it to explore new opening paths (p. 12).

To open the hermeneutic universe of a disciplinary field, diverse techniques can be used. Our work builds on the important book of Barrère and Martuccelli (2009) about the contribution literature, and more specifically modern novel, can bring to sociological thinking and analysis. Their thesis goes beyond Bourdieu's idea (1997) of the existence of multiple types of knowledge besides the scientific one. They argue that if a specific knowledge is contained in artistic creation and more specifically in modern literature, it is interesting and promising to engage social science and literature in a conversation where scientific concepts and notions can be enriched by new

categories, articulations and interpretation derived from a specific reading of literature.

The novel explores differently the social, with a freedom and a taste for analytical testing that is often lacking in sociology; and it is precisely this excess of imagination that the sociologist must identify and then transform. But how make the novel, this highly manufactured fictional material, a true raw data for the sociologist? (Barrère and Martuccelli, 2009, p. 9). In other words, how is it possible to benefit from ideas developed in a fictional form and make them productive from the standpoint of social theory? (Rumpala, 2010, p. 99). For Barrère and Martuccelli, it depends on how the social sciences seized and are inspired by the fiction knowledge. And to ensure a fruitful dialogue, they propose a specific type of reading that they call hermeneutics of invention.

Hermeneutics of invention relies first on the idea, as we said, that there is a proper novelistic knowledge irreducible to other systems of thought and representation (p. 50 and ss.). One can have access to this knowledge once its specificity is recognized, and it is possible to make use of this knowledge from a sociological perspective. The exercise does not consist of finding in novels a scientific hypothesis or a specific type of sociological theory even if it might be possible. The idea is rather to identify specific emerging knowledge that does not fall within the established frameworks and already formalized social theory. It is not a matter of searching, in novels, reflections of today's world, but a way to find new tools that enable sociologists to renew their understanding and interpretation of society. And lastly, explain Barrère and Martuccelli, this exercise does not postulate that prearticulated sociological notions or concepts exists in novels that only need to be extracted. A translation process is required, by which the knowledge found in novels will be reelaborated in the light of the specific interests of the sociological approach. The author synthesize their concept of hermeneutics of invention by the following four points:

- Hermeneutics of invention is only possible by postulating an alterity of a particular type between novelistic and sociological knowledge. Advocating a total breakage or an excessive merge prevents from developing this strategy study.
- This approach is not about establishing a correspondence between a social context (social class, society type, biography of a writer, positions in a field ...) and a novel in order to propose an interpretation of it. Hermeneutics of invention, by contrast, attempts to use fiction works to produce new categories of sociological analysis.
- Consequently, hermeneutics of invention is betting on the existence of knowledge relevant to social sciences in novels. But where depths hermeneutics limit the work of interpretation to what is always conceived as a reading of works - thus requiring more or less traditional forms of comparative accuracy of the interpretation - hermeneutics of invention is driven by another aim of truth.
- Hermeneutics of invention itself exists only when one assumes that the knowledge relevant to social sciences, that is present in the novels, has to be reworked as a stimulus for theoretical imagination. It requires one to recognize a continuous back and forth between interpretation and invention, and especially to accept the "truth" elaborated this way is judged in terms of the analytical openness induced by the categories that has been obtained and reworked (Barrère and Martuccelli, 2009, p. 355-356)[3].

[3] All citations from french text have been translated by us.

This heuristic approach seems promising to take advantage of a vast body of literature that, despite its undoubted relevance in enlightening post-ecological societies, has been under-analyzed maybe because we were lacking, until now, a theoretical justification to link sociological analysis to this specific artistic production.

2. Science-fiction as analytic tool for transition paths to post-ecological societies

Given our central topic, Science Fiction appears indeed as the most natural corpus to conduct such an hermeneutic of invention exercise. Science Fiction literature and cinema is already analyzed by several scholars around the world. Considering the impact of work such as Orwell's *1984* or Aldous Huxley's *Brave New World* had on social debates and reflexions, it is obvious that Science Fiction can't be reduced to a simple imagination exercise (Rumpala, 2010, p. 97), as it is embedded and reflects social dynamic, as well as it takes part in it. For example, after having contributed to its very construction, Science Fiction participates today in the disenchantment of modernity and the weakening of the progress ideology. It is not surprising then that Science Fiction has been analyzed by sociologists, anthropologists, and even by historians as an interesting and complex research object, as shown in collective books published recently (Haver and Gyger, 2002; Moylan and Baccolini, 2003; Hassler and Wilcox, 2008). These interesting works provides different studies showing the potential of Science Fiction in scientific research to better understand our present society but also social changes.

As demonstrated in the book, movies can also be valuable in such exercise as they contain contrast and contradictions expressing the central issues in the struggle to define society (Haver, 2002, p. 8). But Science Fiction can also be analyzed as a factor of the social dynamic, as in Laura Delgado's work (2010). In a study entitled *The Commercialization of Space in Science Fiction Movies: the Key to Sustainability of the Road to a Capitalist Dystopia?*, she demonstrates that "the narrative depicted in Science Fiction can have a marked impact on the attitudes of the public toward specific policies" (p. 1). Building on previous work by Science Fiction scholars about the effect

Science Fiction can play on the acceptance of public policies[4], she argues that stakeholders and policy makers should be aware of this narrative to be able to address public concerns (p. 10-11). In this type of studies, Science Fiction constitutes an object of research more than a new methodological mean. Other scholars explore the educational potential of Science Fiction. In 2005, Mayumi, Solomon and Chang published a commentary on the ecological and consumption themes in Hayao Miyazaki's movies, exploring how this type of media can help to rethink people's role in world ecosystem and play an important role by reaching broader audience than scholarly journal articles, books or reports.

But some authors recognize more specifically the heuristic potential of Science Fiction (Haver, 2002; Gyger, 2002; Rumpala, 2010). In a book review of K. S. Robinson trilogy on the colonization of planet Mars, Costanza explains:

> The best Science Fiction is an exercise in envisioning. By placing the fictional narrative in the future, one can explore a range of core issues of critical concern to the present, and also paint a rich, multicolored picture of a world to which we can aspire (or one we wish to avoid) (Costanza, 2000, p. 167).

In this respect, Red Mars is particularly interesting in Costanza's view as it discuss topics that are central to ecological economics: "full versus empty worlds, natural capital, hyper-Malthusian population growth, environmental ethics, the energy theory of value, the legacy of 'Daly', post-corporate governance (…)" (p. 167). Costanza has explored the envisioning potential of Science

[4] See for example Kunkel, B., "Dystopia and the End of Politics," *Dissent,* 2008, pp. 89-98 ; Berg, C. „Goddamn You All to Hell!" The Revealing Politics of Dystopian Movies," *IPA Review*, 2008, pp. 39-42; Hamilton, M., "Intergalactic Relations and the Politics of Outer Space: Policy Lessons from Science Fiction and Space Fantasy," International Studies Association, 2006

Fiction by using works of different authors to illustrate possible futures (1999; 2000). His articles build on Daniel Yankelovich's idea (1991) that it is necessary to move from public opinion to public judgment to attain a better governance (Costanza, 1999, p. 23; 2000, p. 2). In order to develop such judgment, social dialogue might be organized around several possible scenarios from which to choose a global and shared vision of the future.

> How should society decide among these four visions? A two-step process starts with forming and expressing values with the goal of finding a rational policy for managing human activities. Social discourse and consensus is built around the broad goals and visions of the future and the nature of the world in which we live. When a consensus is formed, institutions and analytical methods are marshaled to help achieve the vision (1999, p. 28).

Science Fiction is used here as a tool of envisioning in the sense proposed by Yankelovich and Costanza; the narratives facilitate the formalization of different visions of the future on which a dialogue can start. Science Fiction participates in the transfer process of research by illustrating scientific analysis and prediction that can be grabbed more easily by social actors and institutions, and help them make political choices and build proper modernization mechanisms. In this perspective, Costanza developed his research around the desirability of four different visions of the future that he has formulated as: Star Trek (the Default Technological Optimist Vision), Mad Max (The Technological Skeptic's Nightmare), Big Government (Public Interest Trumps Private Enterprise), Ecotopia (The Low-Consumption Sustainable Vision). With few national variations, Ecotopia was seen as the most desirable scenario, followed by Star Trek and, lastly, by Big Government. As expected, Mad Max was judged the most negative (2000, p. 14).

But the idea that Science Fiction is a tool of envisioning can be understood not only in the sense of illustrating possible futures, but as a creation process that proposes hypothesis to further

reflexion and deepen the understanding of the production of our societies. It is in this perspective that Science Fiction can contribute the most to a process of hermeneutics of invention. As Gyger explains, Science Fiction is a work of fiction with hypothesis very close to the experimental novel defined by Émile Zola as a tool for investigation, that tries, by experimentation, to understand the mechanisms regulating social behaviors (2002, p. 14-15). But it might be even more promising today given the level and speed of technological change we face since the beginning of the 20th century. As shown by Hartmut Rosa, our societies are subject to an acceleration process since the last century, but this acceleration process does not affect different social systems at the same speed, leading to their desynchronization. Gane (2006) argues that it creates a challenge for social theory that might not be well prepared to capture the changes and tendency given its own development dynamic and rhythm. Building on these two studies, Rumpala questions the appropriateness of today's intellectual tools to think the rapid changes we are facing (2010, p. 98).

In our view, however, the problem of social theory is not so much a matter of a differential speed of development of social theory in regard to an acceleration of social change. As Castell (2001)[5] and others, we are more convinced that behind spectacular new phenomenon, secular behaviors tend to persist that do not change radically the central questions of social theory like hierarchy, power legitimacy, or rationalization process to name a few. This is why in our view, the heuristic potential of Science Fiction relies more on its ability to audaciously nourish hypotheses on which social theory are developed, and stimulate sociological imagination so as to free its reflections from today's institutions and accepted knowledge. As Rumpala, we argue that Science Fiction can be part of a knowledge production process (Rumpala, 2010, p. 98). And as we said earlier, the heuristic potential of Science Fiction relies firstly on the fact that it poses

[5] Cited by Gane, p. 33

hypotheses, and especially audacious hypotheses (p. 99). Using the powerfull “what if …”, Science Fiction invite us to enter in experimentation as some philosophical essays do, and to rethink social systems:

> With all the dimensions it puts together (narratives, descriptions, etc.), one might add that Science Fiction stories have the particularity to develop thought experiments as systems deconstruction/reconstructions. The philosopher Hans Jonas had sensed its usefulness: “the serious nature of Science Fiction lies precisely in the effectuation of such thought experiments well documented, the results of the plastics may include heuristic function described here (see for example the Brave New World by Aldous Huxley) (Rumpala, 2010, p. 102).

This experimentation process unable to question was seems obvious, to introduce doubt and new interpretations (p. 103), in others words to think was has remain unthought, which is the very task of the sociologist (Lenoir, 1988, p. 99).

The body of work in Science Fiction is much diverse and has deep roots in modern literature. From Jules Verne to George Lucas, Science Fiction has ventured into imagined technologies, political and economic systems, human relations, forms of life, etc. The common aspect of these imagined futures is the evocation of ethical debates and conflicts that may reflect (or not) contemporary dilemmas regarding actual or foreseen social practices and technological innovations. Science Fiction extrapolates these dilemmas and put them in different contexts. Creative hypotheses on the future of humanity – and more specifically here, on the future of the human-nature relationship – can be derived from these extrapolations. We thus have developed a methodology to circumscribe these hypotheses that we call “scenarios” of post-ecological societies.

3. Methodology

Extracting scenarios from Science Fiction novels and movies first meant selecting a body of work. We thus selected forty different novels and movies from various anthologies[6]. Secondly, we developed a reading/watching map for each work. Each novel was thus indexed and described in a separate file according to pre determined questions and topics that would inform the analysis of different characteristics of imaginary societies: how hierarchy is constructed and on what rationality is it based or legitimized, how wealth is conceived and what is the definition of well-being, on which principles and mechanisms social cohesion relies, who supports ecological liabilities and how are they considered in economic system, etc. Based on these individual analyses, we identified six human-nature relation scenarios: the fouled nature, the inhospitable nature, the substitutes to nature, the mastered nature, the cybernature and the harmonious nature. These scenarios should be seen as ideal-types, and they rarely appear in a pure form in any Science Fiction work. They however form sufficiently distinct hypotheses on possible human-nature relations in post-ecological societies that they can be distinguished. The next section describes these scenarios in detail. They will enable, in a further section of this paper, to start a dialogue with conceptual categories of ecological economics and environmental sociology.

[6] Given the cultural belonging of the authors of this paper, the works that formed the basis for the analysis origin from diverse countries and were published (sometimes following translation) in English or French.

4. Six scenarios to think human-nature relationship in post-ecological societies

The scenarios presented here are broad hypothesis about the future of society in a specific state of nature. Is nature fouled, completely destroyed, contaminated, artificialised or reconstructed? The scenarios show that different states of nature will impact society in different aspects and with different intensity. In this section, they are presented in a specific order that goes from the worst-case scenario to the most optimistic one. Each account seeks to describe a certain representation of nature, a possible state of destruction of nature, the impacts on social structure and the philosophical debates that come with these specific situations.

4.1 The fouled nature: the downward spiral of human-nature relationship

Pollution, atomic war and other anthropogenic destructions have made planet Earth quasi inhabitable. Nature – or what's left of it – is contaminated or scarce. This is the starting point of the fouled nature scenario. It is the theme of rather dark pieces that propose the following relationship between the state of nature and the state of civilisation: in a context of fouled, impoverished nature, humanity will regress to the state of the chiefdom or the tribe. The classical *Mad Max* series (Miller, 1979) is a good case study of such regression of society into barbarian tribes. Consequences of this regression for social norms and social structures are numerous.

In the worse case scenario the complete disappearance of nature provokes the dissolution of humanity. C. McCarthy's *The Road* (2006) exemplifies this post apocalyptic future where cannibalism becomes the next only way to survive after the gleaning of urban ruins. In less extreme cases, in which life continues to be possible, social relations can be more complex, but also still very unequal. For example, in Iain M. Banks' *Against a Dark Background* (1993), the management of contaminated zones, of the atmospheric streams transporting intoxicants and

radiations, etc., produces a policed social structure where thrive a techno elite beside diverse classes: slums underclass, mercenaries, powerful religious orders, etc.

The fouled nature scenario can thus take various degrees: the more nature is broken, the more society loses social norms and organisation. From cannibalism to the complex hierarchy of multiple and heterogeneous social bodies, the difference rests in the level of destruction.

4.2 Pockets of society in inhospitable nature

Many Science Fiction novels and movies develop the idea of an inhospitable nature that lead human societies to leave Earth or to concentrate in shrunken spaces where cohabitation faces the challenge of finding new norms of common living.

In Silverberg's *The World Inside* (1971), Earth population reaches 75 billions. In order to feed that population, land has to be made free for agriculture, and thus the population lives in gigantic skyscrapers that virtually are vertical cities. In other novels, an inhospitable nature resulting from anthropogenic destruction might have had the same effect: the concentration of huge populations in small, civilised pockets, such as in Jean-Christophe Ruffin's *Globalia* (2004) or John Brunner' *Stand on Zanzibar* (1968).

An interesting feature of this scenario is the reflection that is developed regarding how extreme promiscuity would transforms mores and behaviours. Most of the time, the pockets of society scenario implies the emergence of vertical hierarchies based on a new marker of wealth: available space. At the lowest levels lives a violent, fearful and de-socialised population – one that recalls the worst-case scenario of the fouled nature. The richer and most powerful castes thrive at higher levels. Most of the time this spatial hierarchy and the protection mechanisms of castes, such as endogamy, limit social mobility.

Besides inter-castes domination, promiscuity is represented as a source of permanent conflict and thus as a matter of

normalisation. One main pictured type of conflict relates to sexuality and jealousy. New social norms have to be developed in order to mediate these. Silverberg's novel (1971), for example, develops a set of rules that basically forbid refusing one's demand for sexual relations. This of course has deep impacts on gender equity and family structures, to say the least. Intimacy is another limited condition in overpopulated pocket societies, but not just because of proximity and lack of space. Intimacy is limited by the obsessive preoccupation for security of higher castes. And thus, as in Rufin's *Globalia* (2004), the threat is seen as coming from both the inhospitable nature and the dangerous people from below. Authoritarianism seems to be only possible regime for pockets of society in oceans of inhospitable nature.

4.3 Artificial paradises and the substitutes to nature

Catastrophist views of future destruction of nature are also the starting point of the art substitute to nature scenario. The climate crisis (in P.K. Dick's *The Three Stigmata of Palmer Eldritch* (1965)), consumption society (in F. Herbert's *The Saratoga Barrier* (1978)) and overpopulation (in Fleischer's *Soylent Green* (1973)), for example, would lead human societies to develop artificial universes through the use of drugs or other technologies that allow for a happier living despite of the state of crisis. These novels and movies unmistakably contain a critic dimension of such drugs and technologies, and foster a reflection on the current social tendency to enter into this scenario.

Substitutes to nature could also materialise in artificial worlds such as reality TV, in which people permanently live under the eyes of cameras, in disguised realities that might recall, such as in *The Truman Shows*'s last scenes (Weir, 1998), René Magritte's surrealist painting. Augmented reality is another form of substitute to nature in which individuals themselves become actors of artificial worlds that are far from the real, concrete world. Doubling up a single person, creating avatars, inventing personalities, reconstructing landscapes are also ways to leave others – engineers, capitalists or dictators – with the

responsibility to govern this concrete world. Whatever the consequences since life is elsewhere, in artificial paradises?

Such substitutes to nature do realize, but in a paradoxical and tragic way, Plato's allegory of the cave. But whereas Plato was showing the way from illusion to knowledge, the substitutes to nature show the reverse way, from knowledge to illusion.

4.4 The mastered nature: between geo engineering and bio engineering

Terraformation, geoengineering, and bioengineering and common topics of Science Fiction literature. They of course tell a lot about representations of nature in contemporary societies. In general, such technologies imply to adapt organic and material environment to human needs and will. It thus supposes a very much anthropocentric perspective of nature: a nature that is always at the disposition of humans and that only has value in this sense. The mastered nature scenario exposes this perspective and often places it in the ethical debate on biocentrism and anthropocentrism that is at the core of environmental philosophy (Brennan and Lo, 2010). Three approaches to nature-mastering technologies compose this scenario: terraformation, geoengineering and bioengineering.

Terraformation can be seen as a broad category that would entail the other two. However, because it emerged in the Science Fiction before geo and bioengineering, it also has its own particularities. Terraformation was first naively depicted as something similar as seeding nature on a desolated planet. In the second Start Trek movie *The Wrath of Khan* (Meyer, 1982), a mysterious seeding technology is supposed to produce a new earth-like paradise in a matter of days. Ethical considerations taken here are not really about the value of nature, but rather about the god-like role that humanity is pretending for itself – a role that the terraformation technology is incapable of insuring with its human induced vice of fabrication.

Geoengineering is more in phase with actual Earth and atmosphere sciences. In the context of planet Mars in K.S. Robinson's tale (1993) *Red Mars*, it consists in using multiple methods to warm-up the planet's surface and produce an earth-like atmosphere, for example by releasing CO2 or introducing photosynthesis through modified vegetal species able to thrive on the infertile soil of the red planet. Many methods depicted in Robinson's novel are actually envisaged of geoengineering planet Earth itself in order to mitigate climate change (Thompson and Launder, 2010), which makes the ethical debate quite salient. Geoengineering enliven the ideological duality of anthropocentrism vs biocentrism which confronts proponents of mastering nature in order to make it fit for human needs, and the advocates for considering nature intrinsic value and thus for avoiding to modify it.

In Paolo Bacigalupi's *The Windup Girl* (2009), the lost of nature is the consequence of too much control over it. Massive extinction of species following human crafted viruses and bacteria has rendered bioengineering a necessity. Interestingly, such mastering of nature with bioengineering seems to bring together the two preoccupations mentioned earlier: the fear of loosing intrinsically valuable natural entities and the danger of catastrophes when playing god with nature. When everything is already lost, there are no more ethical matters about biocentrism and anthropocentrism. The issue becomes the reconstruction of social structures and norms.

4.5 The cybernature: intelligence as an emerging propriety of human networks

Artificial intelligence has always been a pillar of Science Fiction and has often been framed along with philosophical consideration about what makes humanity a moral species. But in such endeavour, artificial intelligence was not seen as natural – it was a creation of humanity. Intelligence in the cybernature scenario is a natural phenomenon. This scenario is more recent and closely linked with the rise and diffusion of complex system theory in natural sciences. In short, complex system theory

affirms that systems can produce “emerging properties” at higher levels, and which cannot be understood only through lower level systems (for example, the working of cells cannot be understood only with the rules applying to molecules) (Goldstein, 1999). The cybernature scenario describes the spontaneous emergence of intelligence in human crafted computer networks as an unforeseen emerging propriety. Programmes, viruses and other software eventually acquire the capacity to adapt to change, to reason, to communicate and to reproduce. It eventually imposes itself to the human species as new – natural and cybernetic – form of life. Following this first contact, three interwoven patterns are seen as possible outcomes that might deeply change social structures and relations.

The first pattern implies cyber totalitarians and total war between the organic and the cybernetic. The issues of domination, violence and war are very often associated with the emergence of this new nature. The data treatment capacity of cyber beings and their ability to forecast long term plans based on these data usually make them superior to human beings in matters of military, politics and economics. Combine with some wrath linked to an original wound inflicted by humans (such as in *The Matrix* (Wachowski and Wachowski, 1999)), or motivated by a chauvinist conception of their natural superiority, the cyber beings will tend to make war to humanity. In such scenario – of which the *Battlestar Galactica* series (Moore, 2004-2009) is a good example – the issue soon becomes the survival of humanity itself.

The second pattern reveals the weakness of the cyber beings: their origin and their technological dependency make them a form of parasitism. The computer network is the habitat of the cyber beings. The Internet might itself be the nursery of new forms of intelligence in this scenario. And thus, the new emerging life form always exists in a parasitical relationship with humanity, and this relationship grows at the same rhythm as the human needs for communication through vast galactic space. Often, in this context, the complexity of the communication networks

become out of grasp for human being, and so the dependency relation can become reversed: it is now the humans that need the cyber beings. Dan Simmons' *Hyperion* and *Endymion* saga (Simmons, 1989, 1990, 1996, 1997) is a case of such parasitical relation that comes to evolve in the direction of cyber domination.

The third pattern of the cybernature scenario compares the cyber beings with infantile or juvenile humans, often in search for individual identity. Their considerable power does not shed them from human anxieties and vices. Jane, the emerging cyber being in O. S. Card's *Ender* series (1985, 1986, 1991, 1996) – although she is just partly a cyber being in the sense described above – project herself in the body of a young girl despite her old age. In the *Matrix* or in *Battlestar Galactica*, cyber beings may not be so juvenile in their appearance, but they are nevertheless bearers of immature feelings such as jealousy, haughtiness, and pride.

In sum, the cybernature scenario reflects (and sometime critiques) the underlying ideology of cybernetics and complex system theory, which represents different natural systems encasing each other, from the more simple to the more complex. Human society as the actual apex of system complexity could eventually naturally produce – willingly or not – an "emerging propriety" that could thrive in the flow of coded communication and information that is the Internet. The new cyber beings, however powerful would they be, are not guarantied to be emotionally wiser than human beings. They would rather be dependant on humans and be facing life with insecurity and anxiety.

4.6 Nature as intelligent design

It is not so rare that Science Fiction picture harmonious human-nature relationship, in which a caring nature is attributed a spiritual dimension. It is the case with van Vogt's classic *The World of Null-A*, with Asimov's *Foundation and Earth*, and, in a very explicit manner, with James Cameron's *Avatar*.

In most of these tales, the figure of the tree plays a significant role. The tree nourishes, nurtures and protects – it is a home and

a transportation system, which supposes a rather scare population such as in *The World of Null-A* where the population is limited to a few thousand peoples. In Avatar, nature is made of a nervous system that interconnects all parts into a harmonious holistic system with which the Na'vis can communicate. This picture is very close to the myth of Gaïa that presents planet Earth as a vast organism made of all species and individual beings. In fact, this harmonious nature exists in numerous works that tend to give it a rather spiritual meaning. But the materialist, rational version of it also exists, for example in Asimov's last piece of the Foundation Cycle. And in most cases, individuals that endeavour the exploration of such nature eventually lose their soul, and they ought to bound with nature in order to find it back.

The scenario of harmony between nature and human societies also translates into harmonious social structures. Nature, and very often the tree, enfolds homes that are set respectfully in natural niches – an idea that, in the real world, inspired architects such as Lakasz Kos and Franck Lloyd Wright. Far from imposing itself to nature, such habitats and infrastructures try to make one with nature, to dialogue with it. The tree symbolises the idea of communication of all being in a gigantic web; it touches and protects other trees and plants by the branches and roots, and it gives shelter to animals and humans. The tree thus also symbolises solidarity among all beings.

This scenario clearly feeds from the concept of Theilard de Chardin's concept of noosphere, and James Lovelock's Gaia hypothesis, which considers planet Earth as a dynamic physiological system – instead of a merely physical system – that maintains harmonious conditions for sustaining life. These ideas have spurred many spiritual, and, sometimes, counter-cultural representations about the inherent goodness of nature. It has also been associated with animist beliefs in the currently rising political statements on the "rights of Mother Earth" in global environmental negotiations.

The six scenarios presented here are broad hypothesis about the future of societies in different states of environmental degradation. The cybernature scenario might represent an exception in the sense that it embodies a theory of “nature” – the complex system theory – and doesn’t bother much about the state of nature understood as “environment”. It nevertheless expresses ambivalence between optimism and pessimism in the long-term destiny of technological development. As for the other five scenarios, they appear are easier to ordinate according to the state of ecological destruction that they suppose. Taken together, these five scenarios pose an implicit hypothesis: the state of social wellbeing and organization is strongly dependent upon the state of nature. This hypothesis and other features of the six scenarios potentially bring new perspectives to environmental sociology and ecological economics.

Conclusion

How can Science Fiction help in thinking transition to post-ecological societies? As Rumpala explains, the reflexive exercise that Science Fiction suggests can prevent confusion when facing problematic situations would come by surprise. Moreover, this preparative thinking allows us to select more easily choices criteria. The fictional assumptions may help to open spaces for debate and thus to build or restore a form of collective responsibility with respect to what has not yet happened but that could turn out to become the future (Rumpala, 2010, p. 112).

In extracting six different scenarios on human-nature relationship from Science Fiction's body of work, we first recognize that it is richer than the models usually proposed in social theory. These scenarios are especially interesting because they identify different tendencies from which the future might be built, and to imagine different combinations of them. They surely open and enrich the intellectual schemes that we rely on when thinking human-nature relationship today. But each scenario would have to be analyzed more in depth to pursue this interesting exercise, and relate them to specific theories of environmental sociology and economy.

At the end of the first stage of this first study, and having questioned more specifically the social structure of the societies presented in the different work[7], we might ask if Science Fiction was really innovative in its imagined social hierarchy? It is not so sure on the body of ecological Science Fiction we analyzed, but other dimensions of this project on gender representation and on the corporations in Science Fiction work might give us some new insights that could be fruitfully articulated with our first findings.

[7] This particular topic will be the object of a future article.

References

-, 2011. De Boeck Université. Activités sociologiques. *Sociétés*, 3 (113) 119-127.

Asimov, I., 1986. Foundation and Earth. *Doubleday.*

Bacigalupi, P., 2009. The Windup Girl. *Orbit Books*.

Banks, I.M., 1993. Against a Dark Background. *Orbit Books*.

Barrère, A., Martuccelli, D., 2009. Le Roman comme laboratoire. De la connaissance littéraire à l'imagination sociologique. *Presses universitaires du Septentrion.*

Bello Marcano, M., 2011. Jorge Luis Borges et la dédalographie. Introduction fictionnelle à un archétype spatial. *Sociétés*, 3 (113) 73-80.

Berg, C., 2008. Goddamn You All to Hell !? The Revealing Politics of Dystopian Movies. *IPS Review*, pp. 39-42.

Bourdeau, M., 2009. Agir sur la nature : la théorie positive de l'industrie, *Revue philosophique de la France et de l'étranger*. 134 (4) 439-456.

Bourdieu P., Méditations pascaliennes, Paris, Le Seuil, 1997, 318p

Bourdieu, P., 1997. Méditations pascaliennes. *Paris, Le Seuil*, 318 p.

Brennan, A. Lo, Y.S., 2010. Understanding environmental philosophy.

Brunner, J., 1968. Stand on Zanzibar. Doubleday.

Bryon-Portet, C., 2011. Vers une société plus conviviale et solidaire ? Les associations et réseaux fondés sur la proximité géographique à l'ère postmoderne. *Sociétés*, 3 (113) 107-118.

Cameron, J., 2009. Avatar. *20th Century Fox.*

Cameron, J., 2009. Avatar. 20th Century Fox.

Card, O.S., 1986, Speaker for the Dead. TOR (Tom Doherty Associates).

Card, O.S., 1991. Xenocide. TOR (Tom Doherty Associates).

Card, O.S., 1996. Children of the Mind. (Tom Doherty Associates).

Card., O.S., 1985. Ender's game*. TOR (Tom Doherty Associates).*

Celka, M., Vidal, B., 2011. Le futur, c'est maintenant. L'imaginaire dystopique dans l'oeuvre de James Graham Ballard. Sociétés, 3 (113) 39-47.

Celka, M., Vidal, G., 2011. Le futur, c'est maintenant. L'imaginaire dystopique dans l'œuvre de James Graham Ballard. *Sociétés,* 3 (113) 39-47.

Clapp, J. A., 2003. It Was City that Killed the Beast:? Nature, Technophobia, and the Cinema of the Urban Future. *Journal of Urban Technology*, 3 (10) pp. 1-18.

Costanza, R. 1996. Reintegrating the study of humans and nature. *Ecological economics: Ecological Applications* 6, 978-990.

Costanza, R., 1996. The impact of ecological economics. *Ecological Economics* 19, 1-2.

Costanza, R., 1999. Four visions of the century ahead: Will it be Star Trek. Ecotopia. The Futurist (2) 33, *ProQuest Direct Complete* pg. 23 **...**

Costanza, R., 2000. Visions of alternative (unpredictable) futures and their use in policy analysis. *Conservation Ecology* 4 (1) 5.

David, C.K., 1998. Do Corporations Rule the World? And does it Matter? *Organization & Environment December 11*, 389-398.

Delgado, L., 2010. "The Commercialization of Space in Science Fiction Movies: The Key to Sustainability or the Road to a Capitalist Dystopia?" in America Institute of Aeronautics and

Astronautics. Space 201 Conference and Exposition*: Conference Proceedings. Autust 2, 201. Anaheim, CA.*

Dick, P.K., 1965. The Three Stigmata of Paomer Eldritch. *Doubleday.*

Durham: Acumen Brunner, J., 1968. Stand on Zanzibar. *Doubleday.*

Feuerhahn, W., 2009. Du milieu à l'Umwelt : enjeux d'un changement terminologique, *Revue philosophique de la France et de l'étranger*. 134 (4) 419-438.

Fleischer, R., 1973. Soylent Green. *Metro-Goldwyn –Mayer.*

Forstater M., 2004. Visions and scenarios: Heilbroner's worldly philosophy, Lowe'spolitical economics, and the methodology of ecological economics. *Ecological Economics* . 51, 17-30.

Fouillet, A., 2011. Gustave Le Rouge : le Monde n'existe pas... Sociétés, (3) 113, 91-95.

Fouillet, A., 2011. Gustave Le Rouge : le Monde n'existe pas... », *Sociétés*, 3 (113) 91-95.

Frolova, A., 1998. Ecological reasoning: Ethical alternatives. *Ecological Economics*. 24, 169-182

Furtado Rahde, M.B., 2011. Visualités poétiques, symboliques et imaginaires chez Albert Lamorisse. *Sociétés*, 3 (113) 97-105.

Gane, N., 2006. « Speed Up or Slow Down ? Social theory in the information age » *Information, Communication & Society*, (9) 1, pp. 20-38.

Giroux, D., 2011. Technique et cinématique. Sur les fondements épistémologiques de la fusion de la réalité et de la fiction au XXe siècle. *Sociétés*, 3 (113) 29-38.

Goldstein, J., 1999. Emergence as a construct : History and issues. *Emergence*, 1(1) 49-72.

Graeber, D., 2004. La sociologie comme science et comme utopie, *Revue du MAUSS.* 24, 205-217.

Gyger, Patrick, J., 2002. Pavé de bonnes intentions : détournements d'utopies et pensée politique dans la science-fiction. *Haver (Gianini).* In Haver, G. and Gyger, P.J. (eds), De beaux lendemains? Histoire, société et politique dans la science-fiction. Lausanne, Éditions Antipodes.

Gyger, Patrick, J., Histoire, société et politique dans la science-fiction. *Lausanne, Éditions Antipodes*, 214 p.

Hamilton, M., 2006. « Intergalactic Relations and the Politics of Outer Space : Policy Lessons from science Fiction and Space Fantasy ». *International Studies Association.*

Harris, J.M., 1996. Worls agricultural futures : regional sustainabilit and ecological limits. *Ecological Economics*. 17, 95-115

Hassler, C., Wilcox, D,M., 2008. New Boundaries in Political Science Fiction. *The University of South California Press, Columbia, South Carolina.*

Haver, G., 2002. Introduction. In Haver, G. and Gyger, P.J. (eds), De beaux lendemains? Histoire, société et politique dans la science-fiction. Lausanne, Éditions Antipodes.

Haver, G., Gyger, P., 2002. De beaux lendemains ? Histoire, société et politique dans la science-fiction. *Lausane, Éditions Antipodes*, 214 p.

Herbert, F., 1978. The Sratoge Barrier. *New York : Berkley*.

Kastenhofer, K., Bechtold , U., Wilfing H., 2011. Sustaining sustainability science: The role of established inter-disciplines. *Ecological Economics*. 70, 835-843

Korten, D., 1999. Life After Capitalism. The post-Corporate World. *Kumarias Press.*

Kumarias Press. David C. K., 1998. Do Corporations Rule the World? And does it Matter? Organization & Environment December 11, 389-398,

Kunkel, B., 2008. Dystopia and the End of Politics. *Dissent*, pp. 89-98.

Leakey, R., Lewin, R., 1995. The Sixth Extinction. *Bantam Dell Pub Group.*

Lebas F., Coussieu W., 2011. Avant-propos. La science-fiction, littérature ou sociologie de l'imaginaire ? *Sociétés*, 3 (113) 5-13.

Lenoir, R., 1998. Objet sociologique et problème social. *Patrick Champagne, Initiation à la pratique sociologique, Paris,* (3) 109.

Lever-Tracy, C., 2008. Global Warning and Sociology. *Current Sociology,* 56 (3) 445-466.

Marcano, B., 2011. Jorge Luis Borges et la dédalographie. Introduction fictionnelle à un archétype spatial. *Sociétés,* 3 (113) 73-80.

Mayumia, K., Solomonb, Barry D., 2005. Jason Chang. *Ecological Economics*. 54, 1-7

McCarthy, C., 2006. The Road. *Alfred A. Knopf*.

Meppem, T., Bourke, S., 1999. Different ways of knowing: a communicative turn toward sustainability. *Ecological Economics*. 30 (3) 389-404.

Meppem, T., Gill, R., 1998. Planning for sustainability as a learning concept. *Ecological Economics*. 26 (2) 121-137.

Meyer, N., 1982. The Wrath of Khan. *Paramount Pictures*.

Miller, G., 1979. Mad Max. Village Roadshow Pictures.

Moore, R.D., 2004-2009. Battlestar Galactica. *Syfy (NBCUniversal).*

Moylan, T., Baccolini, R., Introduction : Dystopia and Histories. T. Moylan dans R. Baccolini, Dark Horizons : sciences Fiction and the Dystopian Imiagination, *Routledge, New York*, pp. 1-12.

Munier, B., 2001. De la sociologie du roman au roman sociologique, *L'Année sociologique*. 51 (1) 185-203.

Munier, B., 2001. De la sociologie du roman au roman sociologique, L'Année sociologique. 51 (1) 185-203.

Périer, I., 2011. De la mythocritique à la mythanalyse : rêve de transcendance et transhumanisme. *Sociétés*, 3 (113) 63-72.

Renard J.B., 2011. Science-fiction et croyance. *Sociétés*, 3 (113) 19-27.

Robert U. A., 2007. On the practical limits to substitution. *Ecological Economics*. 61, 115-128.

Robinson Stanley, K., Bantam, 2000. *Ecological Economics* 33, 167-169

Robinson, K.S., 1993. Red Mars. Spectra/Bantam.

Ruffin, J.C., 2004. Globalia. *Paris : Gallimard*.

Rumpala, Y., 2008. Le développement durable appelle-t-il davantage de démocratie ? Quand le développement durable rencontre la gouvernance …, *VertigO - la revue électronique en sciences de l'environnement*. 8 (2).

Rumpala, Y., 2009. Entre anticipation et problématisation : la science-fiction comme avant-garde. *Centre Culturel International de de Cerisy-La-Salle.*

Rumpala, Y., 2010. Ce que la science-fiction pourrait apporter à la pensée politique. *Raisons politiques*, 40 (4) 97-113.

Silverberg, R., 1971. The World Inside. *Doubleday*.

Simmons, D., 1989. Hyperion. *Doubleday*.

Simmons, D., 1990. The Fall of Hyperion. *Doubleday*

Simmons, D., 1996. Endymion. *Doubleday*

Simmons, D., 1997. The Rise of Endymion. *Doubleday*

Thomas, L.-V., 2011. Approche. Introduction à Fantasmes au quotidien. *Sociétés*, 3 (113) 15-17.

Thompson, J.M.T., Launder, B., 2010. Geo-Engineering Climate Change: Environmental Necessity or Pandora's Bos ? *Cambridge University Press.*

United Nations Environmental Programme (UNEP), 2011. Towards a Green Economy. Pathways to Sustainable Development and Poverty Eradication. A Synthesis for Policy Makers, UNEP Publication [online]. Available from: http://hqweb.unep.org/publications/contents/pub_details_search.asp?ID=4188 [Accessed 29 February 2012].

Vachey, F., 2011. Fictions de personnages dans un MMORPG. Entre jeu de rôle et écriture de soi, écrire une personafiction. *Sociétés*, 3 (113) 81-90.

Van Vogt, A.E., 1945. The World of Null-A. *Astounding stories.*

Van Vogt, A.E., 1945. The World of Null-A. Astounding stories.

Vincent, F., 2011. Le sacré et le fan. Étude sur l'univers science-fictionnel de Star Wars. *Sociétés*, 3 (113) 49-61.

Wachowski, A., Wachowski, L., 1999. The Matrix. *Warner Bros Picture*.

Weir, P., 1998. The Truman Show. *Paramount Pictures.*

Williamson, T., 1998. What Comes Next ? Proposals for a Different Society. *National Center for Economic and Security Alternatives. Paperbound*, 185 p.

Yankelovich, D., 1991. Coming to public judgment : making democracy work in a complex world. *Syracuse, New York : Syracuse University Press.*