

Rapid Landscape Change, Vulnerability, and Social Responsibility

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Abstract: In this article I explore the relation between vulnerability to rapid landscape change, on the one hand, and conceptions of land and responsibility for landscape, on the other. I begin by briefly discussing the notion of vulnerability to natural phenomena, and possible ways of addressing it. Next, I introduce some of the ways in which natural phenomena and processes have been perceived, and take note of the sense of responsibility toward landscape often expressed among peoples who are deeply rooted in the land. I continue with a discussion of the basis of the respect that underlies this sense of responsibility and with an account of what respect amounts to in this context. After this I point out how respect for natural phenomena may lead to a lowering of vulnerability. I conclude that it is imperative to develop those ways of conceiving of natural phenomena that will lead to a deep sense of respect and responsibility for the natural world that surrounds us.

Vulnerability and Adaptive Responses

While the thought of rapid landscape change may bring to mind images such as eroded mountain slopes or deep arroyos cutting through alluvial valleys, such change can be brought about in a variety of ways. As Karen Baltgailis of the Yukon Conservation Society pointed out to me, Yukoners, for instance, have been struggling with rapid landscape change clearly caused by *human* activity, such as unsustainable mining and forestry practices. Generally, though, rapid landscape change is brought about by multiple, combined factors, some anthropogenic and others not. Rapid landscape changes (especially changes perceived to be of a catastrophic sort), whatever their causes, should lead responsible decision makers to take precautionary action (or remedial action, if the event has already taken place).¹

In the city of Valencia, Spain, where I spent my adolescent years, the river Turia flooded about a decade before my arrival. Even fifteen years after the event, people would point out the line on some of the buildings,

way over my head, up to which the muddy flood waters had reached. This river had a long history of flooding the city, causing considerable deaths and damage to property over the centuries. So, after the terrible 1957 flood, the city government decided to build a concrete-encased river diversion on the outskirts of town, thus leaving the original riverbed entirely dry (Gozalo de Andrés 2003).

Not everywhere can the resources be found to address catastrophic events with such grand and costly engineering solutions, or with sophisticated devices aided by contemporary technology as have been developed, for example, to save Venice (for a time) from the rising sea.² Nor are most events that bring about rapid landscape change, such as large-scale storms, droughts, flooding of low-lying coastal areas, extremely hot summers, earthquakes, and tsunamis, amenable to straightforward managerial or engineering solutions. Such solutions, moreover, may be problematic in various ways. For one thing, they can lull populations into a false sense of security that can prove to be disastrous in cases of relatively “rare high magnitude events, during which the coping limits of the engineered structure might be breached,” as Nick Brooks (2007) points out.

When such events happen, populations that do not generally expect them will be found unprepared. Furthermore, such solutions, suitable perhaps for “normal floods” but not for the kind that happens every 500 or every 1,000 years, may lead to planning decisions that can turn out to be dangerous. For example, they may lead municipalities to declare land in floodplains fit for construction. This is the case in the Vancouver area, where populous cities are located in the floodplain of the Fraser River, protected only by an aging system of dykes. In the light of these considerations I think that, as individuals and as societies, we need to address basic questions such as whether some of those potentially catastrophic events actually are preventable (since human activities contribute to their occurrence). Given that such events are capable of causing human beings great harm in their lives, livelihoods, and homes, we need to ask how we should think about, and what general approach we should have toward, the natural phenomena involved.³

Volcanic eruptions, earthquakes, and floods have always been potential threats to human well-being, but their effects tend to be limited to relatively small areas.⁴ Lately though, global climate change has become an important topic of discussion both for experts and for the general public. Foreseeably, the phenomena that characterize climate change will be an issue for all human beings, since the warming of the globe is expected to bring about important, and relatively rapid, landscape changes in terms of desertification, thaw of permafrost in Arctic regions, reduction of the size and number of glaciers,

rising sea levels, and so on, in many parts of the world. Reference to climate change may be useful to us in order to survey some of the issues that are generally relevant in the context of human responses to rapid landscape changes.

Climate change has brought into wide circulation the terms “prevention,” “mitigation,” and “adaptation.” It certainly is a reasonable belief, repeatedly supported by the Intergovernmental Panel on Climate Change (IPCC), that human contributions in terms of greenhouse gases are likely of such dimensions that they will contribute to wholesale change in the climate. Applying precautionary reasoning, this has led to the conviction that we need to do whatever is needed to prevent the emission of such gases. Since the effect of greenhouse gas accumulation only comes to bear on climate after a certain lag time, however, it is now clear that a total prevention of global climate change is impossible. Given this conclusion, much recent policy discussion concerning human responses to climate change has been cast in terms of mitigation and adaptation. Internationally, mitigation has become a major concern, to be implemented through limitations on greenhouse gas emissions, and possibly through carbon sinks. Since it has become evident, moreover, that severe effects are going to be inevitable in many parts of the globe, adaptation increasingly is becoming an important complementary policy concern.

In the context of global climate change “vulnerability” is a key term. It can be understood in various ways. As Barry Smit (2005) has noted, vulnerability is the product of distinct factors: exposure and sensitivity to exposure, on the one hand, and adaptive capacity or resilience to exposure, on the other. Neil Adger and Nick Brooks similarly propose that “vulnerability is not simply a function of exposure, but also of people’s capacity to adapt to change. If the latter remains unchanged, increased exposure will lead to increased vulnerability” (Adger and Brooks 2003, p. 29). In other words, given a certain driver of landscape change, such as global warming, that can generate powerful storms, earth slides, droughts, flooding, and so on, vulnerability is a function not only of the objective physical characteristics of landscape features, such as low-lying coastal areas, steep mountain terrain, and so on, but of how ready people are to respond in an adaptive way to those drivers.⁵

Researchers on climate change processes have been discussing a variety of possible physical adaptations to manage such phenomena. In a place with low-lying lands close to the sea, such as in the delta region of Bangladesh, building breakwaters and extended embankments in order to prevent flooding is under consideration (Ahmed et al. 1999). Another way to absorb

change is in economic and social terms. People in the North African Sahel region, for instance, have responded to increased droughts by diversifying land use, moving from irrigated cash crops to more enduring subsistence crops, and by emigration to nearby cities in order to supplement incomes (see Adams and Mortimore 2001).

Despite their obvious importance, I am not focusing on technological, socio-economic, or managerial solutions. Directing our attention primarily to such ways of addressing problems posed by rapid natural change processes may well perpetuate a “fix-it” approach, which, ultimately, may be insufficient to overcome the challenges we face. A more fundamental approach may be needed, going deeper into the cultural fabric that animates all aspects of our interactions with the environment. There are some who address the need for adaptation by exploring the foundations of our cultural makeup. Thomas Homer-Dixon, for example, has proposed that in order to cope adequately with global climate change we primarily need to “front-load ingenuity” (Homer-Dixon 2005, also see Homer-Dixon 2000 and 2006). As business as usual will not do, he proposes that, to generate the physical, social, and economic transformations needed to reduce vulnerability to climate change, we need to develop our sophisticated, human-specific, cognitive capacity to address and solve such problems.

Developing our capacity to generate ideas, and to apply them to practical situations, definitely constitutes an important ingredient in sharpening our coping capacities. But confronting adaptively the kind of situations that bring about rapid natural change is also a matter of acquiring appropriate ways of perceiving, and habits and practices that are suitable to the situations at hand. The importance of ways of perceiving and of appropriate habits and practices can be illustrated in the context of outdoor activities. For instance, while cross-country skiing in mountainous terrain during spring weather one will sometimes face conditions that may result in an avalanche. Even though a highly developed ingenuity may be of use in such circumstances in order to devise strategies of avoidance or, in the worst case, tactics of remediation, such ingenuity may be insufficient if not accompanied by the ingrained precautionary habits and the relevant perceptual framework (which grasps circumstances for their degree of danger) that characterize the experienced outdoors person.

Given that in contemporary urbanized societies people are largely divorced from the natural environment on which they depend, ways of perceiving natural phenomena tend to be highly mediated. In order to grasp the possibilities of lowering vulnerability to rapid natural changes through alternative ways of perceiving the natural environment, I suggest that we

take note of the ways of perceiving and valuing, and corresponding habits and practices, of peoples who have been long-time residents of particular places that are subject to important landscape change drivers.

Sentient Landscapes

While the exploration of cultural responses to natural phenomena, as manifested in various parts of the world, may be productive in fostering a variety of perspectives on the natural environment, this would take us too far afield. In this article I introduce just one account of responses to natural phenomena that bring about landscape changes, which illustrates a way of perceiving such phenomena that is very different from those prevalent in our own contemporary Western societies.⁶

The noted Canadian anthropologist Julie Cruikshank (2001, 2002) writes about cultural responses to natural phenomena during a prehistoric period of climate change in the northwest of North America, recounting some of the oral traditions of the coastal Alaska Tlingit and the Yukon First Nations about glaciers. She retells stories about glaciers that swallow up whole villages but also serve as a kind of “highway” to connect the interior of the continent with coastal areas. According to these oral traditions, glaciers are not conceived of as inert, slowly sliding piles of ice but as entities that pay attention and respond to human behaviours such as speaking carelessly, spilling blood, making noise, or cooking with grease in their vicinity (Cruikshank 2001, pp. 385, 387, 388).

Cruikshank describes these peoples’ way of conceiving the whole ensemble of a certain area, made up of human and non-human beings, including glaciers, by the term “sentient landscapes.” This term takes note of the assumption that, from the Alaska Tlingit and Yukon First Nations’ perspectives, the land is not just inert matter but alive, and capable of something akin to perception and action. To conceive of a stretch of land as a sentient landscape means that its diverse animate and inanimate components are not treated as mere resources (or mere obstacles, as the case may be) but, in some way, as *counterparts* to human beings. (Also cf. Ingold’s, 2000, notion of “sentient ecology.”)

To people who have not been raised in the cultural milieu where these stories originate, the notion of sentient landscapes, and the accounts on which it is based, may seem incredible, even if, as Michael Chase (2007) points out, “the notion of the earth as animate is old and persistent, from Plato and Aristotle to Lovelock’s Gaia hypothesis.” In any case, to focus on the divergence of worldviews would be to miss the point. What is relevant in our context is that Cruikshank describes the type of relationship between people

and land exhibited in these oral traditions as involving “social responsibility” arising from “the social nature of all relations between humans and non-humans, that is, animals and landscape features, including glaciers” (2001, p. 382). This aspect of their approach to landscape, of course, is not unique to Alaska Tlingit and the Yukon First Nations, but common to many peoples who have deep roots in their lands, including the Indigenous people of the Russian North and the Inuit, as well as the Mapuche and Quechua, of South America’s Andes mountain ranges.⁷

What is the normative import of this type of approach to land? Cruikshank points out that this “local knowledge embedded in oral traditions” displays “commitment to an active, thoroughly positioned human subject whose behaviour is understood to have consequences” (2001, p. 391). In her analysis, the type of relationship displayed in these approaches to landscape underscores “the social content of the world and the importance of taking personal and collective responsibility for changes in that world” (2001, p. 391). The basis of this sort of responsibility is worth exploring further.⁸

Self-Organization and Autonomy

In environmental ethics it is common to make a distinction between two sorts of duties or moral responsibilities. On the one hand, one may speak of responsibility *regarding* the natural environment, which stems from duties to other human beings who may be benefited or harmed by how we interact with the natural environment. On the other hand, one may speak of responsibility *to* natural entities themselves, on the supposition that those entities may have a good of their own too. Generally the contrasting perspectives are characterized by terms such as “anthropocentrism” vs. “non-anthropocentrism,” respectively.

Seen in this light, the notion of “social responsibility” for landscapes described by Cruikshank seems not to fall squarely into either type of approach. In environmental ethics responsibilities and duties are generally justified by appeal to the intrinsic (non-instrumental) value either of human or non-human beings, leading to two types of ethics (anthropocentric vs. non-anthropocentric). In my understanding, however, social responsibility for landscape, as described by Cruikshank, is independent of (and in some sense “antecedent” to) the consideration of the intrinsic value that certain entities may be seen to have or not to have. I propose that the crucial feature of the approach to landscape and the non-human beings that populate it, exemplified in Cruikshank’s account, consists in its characteristic conceptualization of natural entities as *active and responsive*.

As I explain more fully in Heyd (2005), responsibility to some entity minimally presupposes conceiving it as being structured in such a way that one can expect it to maintain its organization (at least for a time) in the presence of diverse forces. In this sense it is common in biomedical contexts to argue that the duty of medical staff to care for the well-being of their patients is a given as long as the patients can continue functioning, at least at some level, as human beings, but to accept that, in the case of brain death, there is a legitimate case for not continuing to keep patients “hooked” to machines since their capacity to function has ceased.

In order to clarify what sort of self-organization an entity requires as a necessary condition for any responsibility to arise with regard to it, I have adapted (in Heyd 2005) to this purpose the concept of *autonomy*. I have proposed that the term “autonomy” may be apt here since it literally stands for being one’s own law, or setting oneself one’s own law, and, hence, implies the capacity for organizing one’s self.⁹ (All autonomy is relative, of course, since, obviously, all beings are subject to a degree of heteronomy, that is, to some measure of influence or control by something beyond their own self).

Understood this way, to attribute autonomy to some entity means that it is not only organized in such a way as to maintain its unity and integrity (at least for a time) in the presence of a variety of forces, but that it may exert a systematic force on its environment, at least passively, through resistance to (actual or potential) influences. In other words, perceiving an entity as autonomous is perceiving it as capable of maintaining its integrity, and of being sufficiently unified and dynamically structured to be both source and target of systematically effective forces.¹⁰

According to this description of autonomy we certainly should grant that animals and plants are autonomous.¹¹ Animals seek to endure, defending themselves, as far as they can, against aggression and sickness. Plants have ways of nourishing themselves, of countering pests, and even of controlling the effects of physical damage through mechanisms that seal cuts that would otherwise make the plant lose sap. The case for conceiving glaciers, tsunamis, and weather patterns, such as tropical storms, as autonomous is more problematic. Nonetheless, insofar as these entities and phenomena have systematic ways of affecting their environments, and their power is due to their integrity (evident by the difficulty in splitting these phenomena into their parts), they fit the pattern: all of these entities or processes may be organized sufficiently to maintain a certain unity over some time, and to show resistance to external forces. By themselves, a snowflake that makes up part of a glacier, a drop of seawater moving up-shore, or a raindrop that constitutes part of a tropical storm, are all inoffensive, but when constituting

parts of particularly structured entities or phenomena, such as glaciers, flooding waters, or rainstorms, matters are otherwise, evidently. As such, glaciers, tsunamis, and tropical storms are emergent phenomena.¹²

There presently is considerable research being carried out on the cultural consequences, if any, following the experience of disastrous natural events. The issue is not very clear yet, but it seems that such events typically will remain anchored in a society's cultural memory if the elapsed time span does not go beyond one lifetime. This seems to be confirmed with regard to awareness of the signs of impending tsunamis and volcanic eruptions among some populations living in Papua New Guinea and the Solomon Islands, for example (Davies 2002, pp. 37–38). The result of such cultural memory is that various elements that belong to a particular event are seen as having a certain self-organization, leading to a feeling of respect for such phenomena as wholes, and consequent adaptive behaviours.

These foresightful behaviours may be related to immediate crisis situations, manifested in the recognition of the signs of impending events such as tsunamis by certain individuals who consequently run for safety and alert their community to the danger. Other adaptive behaviours may be directed more toward the long term, such as the permanent relocation of villages or cities (Davies 2002, pp. 39–40; also see Fagan 2000 on the Moche relocation of their capital). Sometimes the respect generated by the recognition of the autonomy of natural phenomena may lead to more indirectly adaptive behaviours, such as the creation of myths and the establishment of taboos about occupying certain areas of the land (Lowe et al. 2002, p. 138). In those cases the direct cultural memory of the disastrous effects of the event may become lost but not before leading to an adaptation that exhibits respect for the natural phenomena at issue through habitual, ritual, or mythical means. So, although certainly not universally true, when people have been repeatedly exposed to phenomena that have sufficient self-organization to act in a unitary, possibly harmful way, one significant adaptation that people adopt seems to be the development of respect for these phenomena.

Respect

Respect is a complex notion, and it would take us too far to fully unpack it here. Suffice it to say that respect for natural phenomena may be of at least two sorts. On the one hand, people may feel compelled to respect some other being or process because of the perceived need to take care of themselves, as a mode of self-protection or precaution (if the effects that such phenomena and processes may have on their surroundings are taken to be significant). This is the sort of respect that we ordinarily speak of when we say that we need

to “respect” the weather conditions when we travel in the high country or in a Canadian winter, for instance. Similarly, people who have experienced a volcanic eruption or an earthquake may develop a respectful attitude toward volcanoes and areas near geological fault lines, respectively.

On the other hand, when the phenomena in question are conceived of as having such integrity and capacity to act that they mirror, even if only up to a point, our human capacity for maintaining integrity and for acting on the world, another form of respect also may seem relevant.¹³ This kind of respect is less a matter of taking care of ourselves than of allowing these other phenomena sufficient space and time to express their self-organization. This is the sort of respect that we ordinarily accord fellow human beings who need quiet space and time to study or sleep, when we take precautions so to avoid making noise, for example. More grandly, it is the sort of respect that is expressed in moral injunctions, such as to always treat humanity as an end and never as mere means (Kant 1993). This kind of respect may arise from a perception of common fates, which, on the basis of a sense of community or conviviality, may lead to conscience and moral sense (also see Heyd 2007, ch. 2).

“Social responsibility” for changes in the landscape, as described in Cruikshank’s account, seems to arise from a combination of the two sorts of respect. Insofar as natural phenomena can cause us trouble, we may want to take precautionary steps, and, insofar as the natural environment is seen as constituted by entities, which are self-organized enough to resemble us in relevant ways, we may want to establish something akin to social relation with them.¹⁴ Although this seems like anachronistic anthropomorphization of the natural world, we may want to take into account that others, such as Michel Serres, have also recently suggested treating natural entities as a relevant counterpart.

Serres (1990/1995) argues that the situation of human beings in relation to the rest of nature calls for a new “natural contract,” a contract analogous to a social contract among human beings. This would be an agreement between human beings and the rest of nature such that the parties to the agreement can co-exist, and possibly even flourish each in its way, effectively requiring restrictions on the degree of human interference with nature. Clearly such a contract would manifest a similar kind of respect for natural phenomena as the kind referred to by Cruikshank when she speaks of social responsibility for land.

In Serres’ analysis, the consequences of our failure to agree on a “natural contract” in modern times have (mis)led human beings into activities that contaminate the natural environments with pollutants such that, ultimately,

“natural services” of the sort taken for granted up to the present (clean water, clean air, productive land, and so on) increasingly are vanishing. A natural contract would seek to limit human activities in such a way that the flow of natural services may continue undiminished for present and future generations. In short, a natural contract of the sort proposed by Serres demonstrates something like social responsibility for the condition of the natural environment that expresses respect for phenomena that seem akin to us in their capacity to act, and to which we may be vulnerable.

Attention to vulnerability is especially relevant in situations in which natural forces may potentially transform landscapes in rapid ways that are catastrophic for human (and other living) beings. I propose that we may conceive of human vulnerability, in relation to phenomena that bring about rapid landscape change, as a function of the attention given to the autonomy of significant natural entities and processes in our environment.

Lowering Vulnerability

As noted, vulnerability depends in part on readiness in the face of drivers of potentially harmful change. The recognition of the autonomy of certain natural phenomena and processes, furthermore, may lead to respect, which can contribute importantly to adaptive capacity. As explained, applied to the relation of human beings to their natural environment, respect may be conceived in at least two ways corresponding to the two ways discussed above: on the one hand, in terms of taking care of ourselves while, so to say, “in reach” or in the effective sway of those phenomena and processes, and, on the other hand, in terms of granting those natural phenomena sufficient “elbow room” (i.e., space and time) for their expression in our environment.

The idea of lowering human vulnerability by respecting natural phenomena and processes in this double sense has already been well understood by some environmental managers. Instead of trying to control rivers and the impact of the sea by raising levees or building more and higher sea walls, for example, some experts argue for the rehabilitation of deltas and polders as flood retention areas for rivers, and for the restoration of mangroves and coastal forests in the case of threatened coastal areas, respectively. Lowering vulnerability by taking note of the self-organization of natural phenomena in these kinds of ways may lead to the development of policies that lower vulnerability, both at the individual and societal level.

It is true, of course, that individuals may only have limited ability to move house or change the conditions in which they gain their livelihood.

Nonetheless, as long as society makes certain material resources and know-how available, a lot of steps can be taken to secure one's private and workplace surroundings with regard to natural phenomena that may turn into environmental hazards. For example, in flood-prone areas people have raised their houses or moved to upper stories (Climate Proofing 2005). In earthquake zones they reinforce buildings and firmly attach objects (such as bookshelves) to walls if these could become hazards during an event.

At the societal level, furthermore, respect for natural phenomena at least means not subjecting populations to unnecessary risks, and making the material, social, and informational infrastructures available that can help individuals and communities address natural phenomena that may potentially be hazardous to them. Practically this may mean making it possible for people to relocate away from high- to low-risk areas, to take a proactive approach regarding landscape changes that are due to arrive in the course of time due to geological or geographical reasons (e.g., earthquakes in areas with fault lines, floods in floodplains) by facilitating appropriate building standards and by regulating the use of suitable building materials, and so on.¹⁵

Conclusion

Rapid environmental landscape change invites us to reflect on vulnerabilities and the ability to address natural phenomena appropriately. Confronting rapid natural changes effectively and responsibly certainly requires scientific research, so that we understand natural processes, and it requires the application of our ingenuity to come up with appropriate physical and socio-economic modifications to our environment and our societies. Finding ways to decrease vulnerability and to strengthen resilience, however, should not be understood as only requiring scientific research, engineering ingenuity, and foresightful planning, since all concrete measures that people take to respond to rapid natural changes are grounded in larger, more encompassing, cultural matrices.

Based on the analysis of Cruikshank's notion of social responsibility for changes in the world, I have suggested that vulnerability, in a more general sense, be understood as a function of the conception of natural phenomena, held by individuals and societal decision makers, and of the values implied by those conceptions. As Cruikshank notes, "our human ability to come to terms with global environmental problems will depend as much on human values as on scientific expertise" (Cruikshank 2001, p. 390). I conclude that, insofar as the recognition of autonomy of certain natural phenomena may

lead to appropriate adaptive behaviour and policies, we urgently need to promote the conditions under which the recognition of such autonomy, and the acquisition of the corresponding deep respect and sense of responsibility for natural phenomena, may be achieved.¹⁶

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Notes

1. I offer a little background to the origin of this paper. Discussions of rapid landscape change tend to focus on the aspects that can be meaningfully addressed by natural science, and, only if the discussions go further afield, might concerns relevant to the social sciences and humanities be considered as well. During the “Rapid Landscape Change and Human Response in the Arctic and Subarctic” conference in Whitehorse (June 2005), for instance, we heard about a number of indicators of rapid landscape change, such as are found in the permafrost record, through dendroecological and comparative photographic research, the study of lake-level changes, and so on, but much less about how people react to rapid modifications of landscape, or how they might think about those changes. Very little has been said with regard to conceptual or value issues in these discussions, and when the topic comes up it is usually only dealt with in terms of very general national or global responsibilities and policy issues. So, this article is intended as a contribution, from a humanities point of view, to the topic of rapid landscape change and human responses.
2. See Merali (2002) on the “Venice Tide Barrier Project” or “The Modulo Sperimentale Elettromeccanico” project, involving seventy-nine mobile floodgates.
3. I fully acknowledge that certain events generally classified as natural, such as storms and floods, may have a considerable anthropogenic component. Nonetheless, so long as the non-human natural contribution to the event is most significant, I will, for simplicity’s sake, speak of natural events, phenomena, or processes. So, while I wouldn’t count the radioactive contamination of the environment following an incident at a nuclear power station, such as happened at Kashiwazaki-Kariwa nuclear power plant 16 July 2007, leading to the spill of radioactive wastes into the sea, I do treat storms, such as Hurricane Katrina, which may partly be the result of anthropogenic greenhouse gases, as natural. (I realize that this is not a neat way of sorting out the world but, for further clarification, see Heyd (2007), ch. 9, “Nature, Culture, and Natural Heritage: Toward a Culture of Nature.”)

4. But see, e.g., Burroughs (2005) on the capacity of “supervolcanoes” such as Toba, Hekla, or Thera, to alter climate worldwide and for considerable time spans.
5. Given the diversity of socio-economic and political situations in which people find themselves, vulnerability varies on both individual and collective levels. (On how to think about vulnerability, also see Kelly and Adger, 2000.)
6. There are other relevant accounts, of course. See, for example, Brian Fagan (2000) who contrasts the responses to natural phenomena during climate change of Sahelian herders, South Africa’s San, and South America’s Moche, among others.
7. When I write of having roots I do not intend to differentiate between nomadic and sedentary peoples. Also see Brody (2001) on the deep connection to particular stretches of land that even hunter-gatherers, who generally are called “nomadic,” have.
8. See Heyd (2007) for a more developed view on responsibility for the natural environment in which people are enmeshed, especially chapter 4, “Environment and Culture in Latin America: Community, Autonomy and Resistance.”
9. Also see Prigogine and Stengers (1984) on self-organizing systems, and Maturana and Varela (1973/1980) on autopoiesis. I thank Michael Chase for pointing out to me the relevance in this context, moreover, of Kaufmann (1995) and (2000).
10. I thank Mark Woods for helping me clarify these points. He suggests that the autonomy of nature “contrasts with obedience: wild things are autonomous because they have not changed to adopt the imposed will of another. We can also think of autonomy in terms of authenticity: being self-expressing, self-actualizing, or self-realizing” (Woods 2005).
11. But see Kant (1993) for giving a sense to the term “autonomy” that makes autonomy a property that exclusively may characterize human beings.
12. See Holland (1998). I owe this reference to Michael Chase.
13. It is notable that there may be good adaptive reasons for our tendency to anthropomorphize diverse entities and processes in the natural environment. See Burroughs (2005). Phenomenologically it makes sense to take a moral perspective with regard to those beings that resemble us because we can empathize and sympathize with them. This does not mean, however, that our capacity for respecting other beings necessarily is limited to those that resemble us, as is evident in the case of respect for human beings of diverse types, all of whom necessarily fail to resemble each of us in some ways.
14. It is notable that the feeling of respect and sense of responsibility may well arise with regard to phenomena and processes that one may not suppose capable of intentionality, understood as the capacity for making outright choices among possible courses of action.
15. For a list of possible steps that both individuals and society in general could take with regard to climate change, see Dauncey (2001). On historic and prehistoric human responses to powerful environmental impacts that did, or could have,

amounted to catastrophes for human societies, see, for example, Leroy (2006) and Diamond (2005).

16. Also see Carol Geddes's account in Jickling (1996), which points toward the kind of experience, linked to a narrative of land, required to really understand the notion of respect for land. I am grateful to Edward Butterworth, Tony Berger, and Jutta Gutberlet for attentively reading this essay, and providing me with useful comments. I am also indebted to Nick Brooks and Michael Chase, as well as to two reviewers of this journal, who all have made a number of excellent suggestions for improvements of this version of the article. Finally, I would offer my appreciation to Deanna McLeod who went through the paper with great care several times and made further valuable improvements in expression and diction.

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