

Chapter 1

Nature in Motion

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1.1 The New Visions of Nature Program

As Raymond Williams (1983) famously declared, nature is one of the most complex words in the English language – and, we may confidently predict, its Germanic relatives including Dutch. The workshop that took place in June 2007 in the Netherlands, from which this volume is derived, was based on an earlier program exploring connections between our concepts of nature and related concepts of science and religion. Though one may not immediately expect these three realms to be interrelated, countless examples suggest otherwise.

Consider the journal *Nature* from December 1999, in which the DNA sequence of human chromosome 22 was published (Dunham et al., 1999). This historic event was visually represented on the cover of the issue by the famous Creation of Adam image painted by Michelangelo in the early 16th century in the Sistine Chapel, in which God's finger stretches to touch that of Adam. Here, on the cover of one of the top scientific journals in the world, a journal titled simply *Nature*, is one of the most famous religious images in the world.

What is surprising, arguably, is not that we encounter so many instances in which nature, science, and religion are interwoven, but that we often defend these realms as separable – science and religion as diametrically opposed, for instance, or nature as some Romanticist notion far removed from the rigor and precision of scientific discourse. No matter how we tend to conceive of nature, science, and religion as differing realms, our ideas and practices related to nature say a great deal about the historic authorities underlying modern culture, science and religion; thus, one way to shed light on these domains of authority would be to look carefully at our assumptions regarding nature.

This was the objective of an academic research program titled New Visions of Nature, Science, and Religion (Proctor, 2004, 2009). The New Visions program

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drew together fourteen scholars – natural scientists, social scientists, humanists, and theologians – for a period of three years. Meeting at regular intervals in Santa Barbara, California, under the sponsorship of the University of California and with funding provided by the John Templeton Foundation, New Visions scholars each offered insights on nature, science, and religion from their particular academic vantage point. At the close of the program, four regional workshops outside of Santa Barbara continued this exploration with a range of topical foci: the workshop in the Netherlands was one of these.

To lend some degree of coherence to our discussions, we focused on five concepts of nature – including both biophysical and human nature, external and internal nature – in particular. These concepts were selected to represent a continuum of disciplinary interest across the sciences and humanities. Arranged in order from the most scientific to the most humanistic, the five included evolutionary nature, emergent nature, malleable nature, nature as sacred, and nature as culture.

Evolutionary nature is a sweeping scientific vision of nature as arising from evolutionary processes. It is the dominant theory for the origin and diversity of living systems, and via fields such as evolutionary psychology has been applied to account for the nature of human thought and behaviour – i.e., culture – as well. Implications for science and religion are varied: what some consider to be the ultimate triumph of science over religion à la evolutionary theory, others disparage as scientism, a religion of science. Evolutionary nature has generated a great amount of discussion and debate over the relations between science and religion in societal realms such as education and medicine. Depending on how the continuity of the human species with other species is interpreted, evolutionary nature can be seen as either a challenge to human distinctiveness – a longstanding theological question – or a reminder of our biological, and possibly moral, connections with the rest of the living world.

Following the concept of emergent nature, nature is understood as an emergent reality, one in which its parts do not sufficiently explain the whole. This vision has a long history, but more recent scientific work into complex systems has focused on relations between systems at various scales of time and space. In this hierarchy of scales, complex systems theory challenges the reductionist notion that the whole can be understood via analysis of the parts, and attempts to explain the origin and behaviour of a wide range of complex systems – ecosystems, the heart, even consciousness – as emergent phenomena. Emergent nature has been widespread in the natural and even some social sciences, but it has also garnered interest in the humanities and theology. It thus has offered a means of unifying disparate scientific disciplines, and in some cases has been proposed as a means of harmonizing science and religion, given that both attend to emergent, complex phenomena as their principle concern.

The third vision, that of malleable nature, stands in the middle of the five, and as such is equally dependent on, and of interest to, scholarship in the sciences and the humanities. The core notion is that of biophysical and human nature as subject to human alteration: this broad interest in malleable nature stems from its many related forms, running from genetic manipulation to virtual worlds. Whereas in evolutionary theory culture can be seen as a function of nature, here at this point in the

five-vision continuum nature is deliberately fashioned by culture. This approach to nature directly challenges the Aristotelian contrast between *physis* and *techné*, that which operates of its own accord (a classical understanding of nature) and that which is deliberately fashioned by the human hand. Depending on how malleable nature is applied to the realm of science and religion, it can serve as either an endorsement or a critique of science *qua* technology, yet certainly challenges essentialist notions of human nature as viewed from either scientific or theological points of view.

The vision of nature as sacred is a departure from the others in that it is primarily a popular, not a scholarly, point of view, but it has garnered considerable recent interest by scholars of historical or contemporary culture and by theologians. In this approach, nature is understood as possessing sacred or spiritual qualities, or perhaps even being fundamentally spiritual in its essence. What this concept challenges is the notion of biophysical and human nature as mere matter; this metaphysical perspective commonly leads to significant moral implications, for instance in how humans should treat biophysical nature, or the value of human life. Yet how should this notion of sacred nature be understood scientifically, other than as one of many possible (subjective) attitudes one can take toward nature? Despite its ambiguities as viewed from most scientific vantage points, nature as sacred has garnered some support within institutional religion, leading to a wide variety of ‘greening’ campaigns, and has also underscored the flourishing of nature-based spirituality outside of organized religion as well.

Finally, the vision of nature as culture is an outgrowth of what could be seen as the default epistemological stance of the humanities: here, in stark opposition to evolutionary theory, nature (as in our conception of nature) is seen as the product of culture and not the other way around. Whereas malleable nature challenges the ontological status of nature, i.e., whether certain things understood as natural are ‘really’ natural or bear traces of human influence, nature as culture challenges the epistemological status of nature, i.e., whether our ideas of nature reflect more or less truthfully the natural realm as it really is or bear traces of human construction. The humanities are all about the force of human ideas, whether manifested in literary, artistic, or practical form; given the force of the idea of nature through history – just think, for example, of the power of ‘natural’ as a criterion dividing good from bad in so many moral debates – it is entirely understandable that nature is appropriated in the humanities not simply as a reality but as a human idea of that reality. The implications of this notion for science are fundamental and shaking: is science, to put it simp(listic)ly, a systematic means of unlocking the secrets of reality or is are the truths it reveals about this reality merely a product of the cultural milieu in which science is practiced? Nature as culture thus could be seen to pose a broadside challenge to the objectivity of science. And it does the same to religion, where claims as to for instance the divine origin of sacred texts are similarly understood as cultural constructions.

These five visions of nature/science/religion arise from differing scholarly locations; near neighbours (e.g., evolutionary nature and emergent nature) are easier to harmonize than distant neighbours (e.g., evolutionary nature and nature as culture). Yet, ironically, none of these visions purport to be located: all aspire toward

universalistic claims on nature, science, and religion. Thus the considerable power and comprehensiveness of these visions is also possibly their downfall, as critical ontological and epistemological assumptions travel far from their point of origin. If there is thus anything to be learned in general by investigating visions of nature, is that they are inevitably visions not only *of* reality but *from* a particular point of view. Unless one believes in the possibility of a Gods-eye view – and that this is a possibility for mere mortals – the fantastic power of these visions in potentially uniting all of biophysical and human nature, and explaining all about science and religion, fades as so much about them can be understood in terms of their disciplinary origin.

1.2 New Visions of Nature: Complexity and Authenticity

All five visions of nature represent a powerful view on nature in its entirety. Their very plurality, however, implies that none can be truly comprehensive. In June 2008, a group of scholars from various fields of expertise met at the Wageningse Berg, along the borders of the Lower Rhine in the Netherlands, for a workshop to investigate means of dialogue and possible synthesis, in which the wisdom of all different visions could somehow be included.

Point of departure of the workshop was the idea that contemporary visions of nature and their mutual relations have been deeply affected by the mutual pervasiveness of science, nature, and society.

1.2.1 *Science and Nature: Beyond Reductionism*

We live in a time of remarkable scientific achievements and technological developments in ICT, neuroscience, nanotechnology and especially in the domain of the life sciences. Science and technology have entered into an ever more intimate relationship, to become what is nowadays called the techno-sciences. In many ways, the *Human Genome Project* exemplifies best what is taking place in those techno-sciences in general, with similar examples and trends to be found in other disciplines as well. Everywhere, we witness the emergence of large-scale, trans-national and interdisciplinary forms of techno-scientific collaboration. These large-scale research programs raise various important questions of an epistemological, ethical, societal, economic, and cultural nature. These trends emerge within the life sciences, but they are manifest in other areas, such as the ecological sciences, as well. Over the past twenty years, the ecological sciences went through a transition from preservation and conservation to restoration and re-creation.

Until recently, the interaction between science and nature was often addressed in terms of two grand narratives. There was, first of all, the ‘positive’ grand narrative of how technological and societal progress – made possible by science – has gradually allowed us to master and improve nature ever more forcefully. The methodological reductionism of modern science together with to sophisticated instruments of modern technology made it possible to control and exploit natural recourses for the sake

of mankind. This grand narrative was counter-balanced, so to speak, by another, 'negative' grand story of how western science- and technology-based societies – unsustainable as they are – are heading towards catastrophe. The reductionism of science was assumed to be deeply problematic because it failed to grasp the richness of nature. In stead of leading to prosperity, modern science would eventually and inevitably provoke a natural response, risking an ecological apocalypse.

It is fair to say that both narratives are one-sided at the least. For a better understanding of how science and nature are interconnected and mutually pervasive, it is essential to look at the complex relationships between science and nature in a more analytic and detailed manner, on the basis of empirical research, and beyond stereotypes. Science and nature are intimately interconnected. But the exact direction of this interaction is still somewhat diffuse.

According to a more or less optimistic view, we have entered an era in which the sciences may be expected to contribute to our efforts to monitor, analyze and solve problems that emerge from our 'past performance,' from such detrimental interactions between science, technology and environmental pollution. Biomaterials, genomics and nanoscience are expected to produce sustainable technologies and contrivances that are more congenial to nature. At the same time, however, new and unknown hazards may be awaiting us once we enter these avenues of science-based innovation. The famous tale of the sorcerer's apprentice may take on a whole new meaning in the future. The implications of the mutual pervasion of science and nature, however, are not that obvious. One thing is clear, however, science and nature can no longer be seen as two separate forces in opposition.

1.2.2 Science and Society: Post-Normal Science

The rapid development of the life sciences and technologies not only affects the relation between science and nature but has a profound effect on the relation between science and society as well. The life sciences have developed an ever increasing capacity to affect human life and the environment, whereas at the same time deep uncertainties exist on whether these effects are manageable at all. As a result, societal stakes in the life sciences are becoming higher and higher and with that, the call for a more stakeholder or community-based epistemology. Also within life science itself, researchers become increasingly aware of the irreducible complexities and uncertainties that surround our knowledge of nature. Although the technological knowledge of the life sciences is often highly accurate and effective, it can no longer be seen as the only legitimate and reliable source of knowledge concerning the natural world. A similar development can be seen in other scientific and societal fields, where the autocratic attitude and analytical practices of the traditional science and technology institutions are challenged by voices demanding respect for local knowledge, a plurality of perspectives and epistemologies 'through which the world comes to presence' rather than it being dissected and re-assembled.

It is clear that the traditional, clear-cut distinction between science and society is no longer viable. What the increased mutual pervasion of science and society will

entail for our vision of and relation with nature, however, is yet to be seen. Will it result in a real change within the dominant scientific approach? Some believe, it could lead to a coming together of the modern scientific view with older, non-dissecting and non-reductive paradigms in both the natural and social sciences and thus give rise to a new, trans-disciplinary, 'post-normal' science. Current research suggests, at least, that public visions of nature are in fact already spiritualized and embedded to some extent, e.g., in the contextual and spiritualized understanding of humans, animals, ecosystems and cosmos as whole entities, or the embedded and storied understanding of landscapes as meaningful dwellings. What influence may the inclusion of such post-normal types of knowledge have on scientific and public visions of nature? For instance, will mainstream science ever be able to engage these visions rather than undermine them?

1.2.3 Society and Nature: Reflexive Modernity

As Jonas (1979) pointed out, traditional ethics tended to focus on short term obligations, based on the assumption of a basically given, eternal and unchanging human nature as a reliable foundation for the Good and presupposing a limited reach of human action and therefore of human responsibility (towards nature, seen as unchanging and all-powerful). During the last two centuries however, due to the accelerated development of science and technology, the impact of human beings on their natural environment has grown exponentially. Some scientists have even framed this development in terms of a new geological era, the so-called 'Anthropocene' (Crutzen & Stoermer, 2000). It could be, of course, that we are overestimating the extent to which we humans are able to control the fate and further evolution of nature. There are reasons to suspect that we are (as yet?) unable to fully appreciate the complexities of natural systems, let alone control them. Nevertheless, with an increased power over nature, one could argue, our responsibilities towards nature grow as well. Jonas, for instance, argues that the growing extension of our technological power implies an equal extension of our ethical responsibilities, ultimately including the earthly ecosystem as a whole. A traditional view of the relationship between society and nature still tends to think in terms of a mono-causal relationship between what *we* do and what takes place in nature. However, the relationship between society and nature may be less linear and more complicated, and therefore imbued with more uncertainty.

Modernity's technological power trip has been so 'successful' that it has become a danger for the (global) natural environment on which it essentially depends. As a consequence, modernity has become thoroughly *reflexive*, to use an expression of German sociologist Ulrich Beck (1986): we have developed an awareness of the incalculable and negative side-effects that our own actions have on the natural environment, in which we are nevertheless destined to sustain ourselves. One of the implications of reflexive modernity is that the notion of radical uncertainty has to be built into our moral assessments.

The traditional idea of a clear separation between the human and the natural, or the cultural and the natural, has also been challenged from a different perspective. Donna Haraway (1991), for instance, has shown that nature and the artificial today are intimately linked, questioning the very idea of nature as a realm that can be separated from the human and the cultural. Not only our *ideas* of nature are deeply mediated by culture, even our own bodies are to an ever increasing degree an inseparable mixture of nature and technology. But if we all are indeed to some degree cyborgs (as Haraway argues), if we are indeed ‘artificial by nature’ (Plessner, 1928) or ‘natural aliens’ (Evernden, 1993), than the idea that nature can somehow provide us with a criterion or moral measure against the arbitrariness of our technological interventions become highly problematic. If nature and society are intimately linked, if nature has become culturalized and culture naturalized, than we can no longer separate the ‘authentic’ and ‘natural’ from the ‘artificial’, ‘unnatural’ and ‘false’. The moral consequences of this have still to be thought through.

1.2.4 New Visions of Nature: Basic Questions

Today, we witness the emergence of new visions of nature in different fields of expertise. What these new visions of nature typically have in common, is that they somehow testify that nature is far more complex than previously envisioned. The new complexity of nature can be discerned at two levels. With regard to the object in question, nature itself is seen as more complex than previously acknowledged. New scientific insights stress that many of the old ideas of nature as being malleable, knowable and controllable by technological means have to be reconsidered.

The picture also gets more complicated on a different level: there no longer exists one privileged perspective on nature. The autocratic attitude and analytical practices of the traditional science and technology institutions are challenged by a plurality of perspectives and epistemologies that open up the world. Not only are our images of nature ‘itself’ increasing in complexity, but there is also a multitude of relevant perspectives on nature.

In this volume, we will focus on the emergence of these new visions of complex nature in three domains. In Part II, we will focus on public visions of nature, which are increasingly difficult to distinguish from views of technology and culture. In Part III, we will go into the modern life sciences, notably in contemporary genomics which stresses the irreducible complexity of the genomic makeup of life forms. In Part IV we will look into contemporary landscape philosophy en environmental ethics, where one can discern a shift of attention from universal ethical principles about nature to the plurality of local narratives of place. In all these fields, the new emerging complex visions of nature raise serious questions about the authenticity of our relation with nature.

With regard to the *public visions of nature* (Part II) one can discern different ‘complexifications’ of our vision of nature. First, people seem to be able to shift their basic attitudes towards nature; their view of their relationship with nature depends largely on the specific contexts in which one relates to nature. Furthermore, the

images of nature seem to complexify as well, since what is conceived as nature becomes increasingly intertwined with all kinds of cultural and technical 'mediations'. All this increases the complexity of human-nature relationships. What some people consider to be natural, others perceive as unnatural. In recent surveys about public visions of nature, emphasis is being put on the way in which nature and technology have become intimately intertwined. Our relationships with nature are increasingly influenced by the artificial and the technical. Robotics, artificial reality, broadband internet connections and new 'artificial landscaping' all influence our views of nature, and as a result the question of an adequate relation with nature is becoming a complex one. Does this mean that visions of nature are not foundational but merely contextual? And what does this mean for the evaluation of our relationship with nature? Ever since the romantic age, these relationships have been framed in terms of authenticity (Taylor, 1991). If we increasingly experience 'artificial' types of nature that are hard to distinguish from 'real nature', if technologically mediated nature experiences like robots and plastic trees are becoming ever more common, then what can the term 'authenticity' refer to? Can one still find a criterion with which one can distinguish between more and less authentic relations with nature? And what does the questionable authenticity mean for public participation in landscape management? Can 'real nature' still provide us with a kind of 'measure' for authenticity if nature and culture are getting more and more interrelated?

In the *life sciences*, notably in contemporary genomics research (Part III), researchers become increasingly aware of the irreducible complexities in nature and of the uncertainties that surround our knowledge of nature. On the one hand, the dominant vision of nature in life sciences gradually but irreversibly shifts from mono-genetic determinism towards a more complex, multi-factoral view of nature in contemporary genomics. On the other hand, although the technology-based knowledge of the life sciences is often highly accurate and effective, it can no longer be seen as the only legitimate and reliable source of knowledge concerning the natural world; alternative views and perspectives have to be considered as well. Both developments tend to complexify our views of nature. This shift demands a new attitude towards the malleability of nature. Our increased understanding of the complexities of bodily life is expected to allow us to fine-tune our styles of intervention. But is it true to say, as Peter Sloterdijk (2001) does, that the allo-technologies (against nature) of the past will be replaced by homeo-technologies (attuned to nature) of the future? Have we really transcended the orientation towards mastery of nature that used to inspire biotechnology as a research program? Or are we merely developing more sophisticated tools that eventually will reinforce rather than question a vision of nature as 'malleable'? What metaphors are best suited to express our new relationship towards this new complexity of the genome? And what are the consequences of this coming end of the era of genetic determinism for our self image? Could it enable us to renew our understanding of the degree to which we ourselves are determined by our genes? Could the newly discovered complexity of the genome offer us a new type of 'freedom' or will it rather lead to a more radical view of 'detachment' from nature?

Our views of *places and landscapes* (Part IV) also seem to have increased in complexity on different levels. Traditionally, environmental ethics evaluates human relationships with the environment starting from ‘objective’ ecological norms – and articulating environmental values in terms of ‘intrinsic values’. However, this approach seems increasingly at odds with today’s scientific insight in the dynamic character both of ecosystems themselves and of human socio-ecological practices within the natural environment. In response, in recent years, some environmental ethicists have even rephrased the age-old idea that nature should provide a model that we should try to mirror in our actions. In water management, for instance, the idea that river management systems should attempt to control water flows as well as water related social processes and conflicts, gradually makes place for a more ‘fluent’ approach that allows rivers to take up space, and allows all kind of social conflicts to submerge and be dealt with in the open. This new approach tries to do more justice to the highly contextualized way in which people ‘read’ meanings in particular places and natural features. In an even more radical attempt to leave behind the traditional universalistic ethical perspective, ‘ethics of place’ (Casey, 1993) aims to emplace ethics itself and to shift our temporal perspective on nature management and preservation towards an ethics of place that carefully investigates the ‘moral knowledge’ that is embodied in a place itself. A similar tendency towards complexity of nature can be noticed in the process of ‘glocalization’. Such a shift from a global environmental ethics to a particularistic ethics of place raises some serious questions, though. On the one hand, it seems obvious that particular sites and places require a proper and particular ‘focal length’; on the other hand, many environmental problems seem to demand a global perspective. Does this growing awareness of the complexity and dynamic character of natural systems inevitably lead to an ethic and an ecosystem management approach that is more in tune with the natural processes? Or will it undermine the rational debate about a proper attitude toward nature, and ultimately to ethical relativism that prevents us from dealing with today’s global environmental problems? What could an authentic relation with our place mean in an age, where the links between geographical locations and local culture is loosening and several narratives about any particular place appear to exist next to each other?

In all these fields, new emerging visions of nature seem to acknowledge complexity of nature and complexity in our visions of nature. At both levels, this complexity raises questions about authenticity. In this volume we try to investigate some of these questions.

1.2.5 Authenticity?

One could argue in a number of ways that the increase of complexity in our visions of nature raises questions regarding the authenticity of our relation with nature. One way would be that old attempts to ground a particular ethical relationship with nature in an understanding of what nature really is, is undermined by the increasing complexity of our new visions of nature. Certain relations to nature can still appear

to be more ‘natural,’ authentic, or adequate to the object, but as our vision of nature becomes more manifold and fragmented, any ideal of authenticity will become ever more problematic. On the other hand, one could argue that a romantic ideal of an authentic relation with nature suffered from essentialist and oversimplified views of nature – violent reductions of ‘nature itself’. Now that we are increasingly able to recognize the complexity and subtlety of nature, it should at least in principle become possible to find a more authentic stance towards her.

However, we should be aware that the concept of authenticity itself is already highly debated and complex. David Lowenthal (2008) has argued that the concept of authenticity has shifted over time and between cultures, and ‘the diverse authenticities we appraise – substance, form, originality, creativity, emulation – are seldom compatible.’ This ever shifting meaning of authenticity has had far-reaching consequences:

The very quest for authenticity altered its nature [. . .]. Cultural relativity made authenticity a capricious will-o’-the-wisp, even a contradiction in terms. (p. 7)

But what does authenticity really mean, if, as Lowenthal has it, ‘the criteria of authenticity we choose reflect current views about how yesterday should serve and inform today’ (p. 9)?

To answer this question, Lowenthal discusses the history of the concept of authenticity in more detail. In medieval times, Lowenthal shows, the ideal of authenticity was very different from ours for it was normal to rework things outworn and replace them for present purposes. In the middle age Europe ‘renovations, not ruins, were authentic.’

Sacred relics apart, integrity inhered in wholeness. Broken statues and damaged buildings became admirable by being restored to entirety. Few cared if an arm or a leg was original or a torso bore its true head; authenticity meant completion. (p. 13)

In the late 18th century the ideal of authentic wholeness succumbed to the contrary cult of fragments and ruins. ‘To be authentic, an object, a structure, or a landscape must be truncated or fragmented.’ (ibid.) One century later, ‘Authenticity meant replacing defective original remnants with modern realizations of the spirit of antiquity.’ As a result, ‘conservators ‘restored’ venerable structures and traditions to what they ought ideally to have been.’ (ibid.) Finally, in the mid 20th Century, yet another idea of authenticity surfaced as ‘improving the past gave way to archaeological exactitude, a scholarly purism that deplored tampering with what was original. Honest authenticity now came to mean intervening as little as possible and making manifest every unavoidable alteration, even to the sacrifice of visual integrity.’ (ibid.).

Finally, according to Lowenthal, ‘recognition now dawns that tampering with the past is inescapable’. ‘That their remade or remaindered past was authentically correct has been the fond faith of each successive conservation policy in turn. [. . .] It would be folly to think that we ourselves are exempt.’ However, according to Lowenthal, ‘most propitious in heritage today is our ready admission that we never get things totally, eternally right. Ours generation openly admits

fallibility. And humility helps free us from the hubris of arrogant and self-defeating perfectionism.’ (p. 14).

This having been said, it should not come as a surprise that the different authors in this volume use the concept of authenticity in different ways. We have not attempted to bring all these uses of the term together. Recognize that there is not one correct concept of authenticity, does not render the term useless. Despite its ambiguous character, the concept of authenticity still remains suited to critically pose all kinds of normative questions regarding our relation to nature.

1.3 Layout of this Volume

1.3.1 *Part II: Public Visions of Nature*

Part II of this book investigates in what way public visions of nature are being affected by the threefold pervasiveness of science, society and nature.

In Chapter 2 (‘Technological nature – and the problem when good enough becomes good’), Peter Kahn, Rachel Severson, and Jolina Ruckert wonder if it matters (in terms of the future wellbeing of our species) that we are replacing actual nature with technological nature – technologies that in various ways mediate, augment, or simulate the natural world? They argue it does. They start with an overview of a laboratory’s research project that investigates the psychological effects of children and adults interacting with three instantiations of technological nature. In the first experiment, they provided their test subjects with a technological view of a landscape (a real-time digital plasma window display of nature), in the second with a technological dog (Sony’s robotic dog, AIBO), and in the third with a technological human (ATR’s Robovie). Next, they draw on Buber’s account of an I–You relationship to assess whether these interaction with technological nature can be considered as authentic interaction. Finally, they discuss a peril of technological nature: that it will garner some but not all of the effects of actual nature, come to substitute for actual nature in human lives, and thereby shift the baseline across generations for what counts as a full measure of human experience and human wellbeing. Maartje Schermer will provide them with a comment (Chapter 3).

In Chapter 4 (‘The artificial body: an empirical exploration of lay ethics’), Riyan van den Born and Wouter de Groot also ask what the consequences will be of the growing artificialisation of nature for public views of nature. More specifically, they investigate the meaning of technologically mediated nature experiences, such a genetically altered food, bodies and landscapes. In landscapes, people typically see a long gradient from purely artificial cities through a domesticated agricultural middle zone to authentic wilderness. More or less parallel to the way in which human society intervenes in ‘pure’ nature, much of the application of genomics will imply an artificialisation of the human body. What do lay people think of technological interventions that would create the human body as a comparable mixture of the technological and the natural? Based on 30 semi-structured interviews in the Netherlands,

the authors discuss the ethical principles with which people evaluate human interventions in nature and the body. They have surveyed the public response to four series of exemplars of interventions in nature and the body, with genetic as well as non-genetic interventions, and with different degrees of intervention (e.g., from a plastic tooth to a complete plastic body). Their results reveal the richness of people's ethical reasoning and show some differences between categories of respondents. Overall, people's ethical reasoning could be captured in a scheme of three areas. The first area is an 'area of frivolous purpose', where interventions are rejected because they do not serve a fundamental aim. In the second area – an area of 'too deep, too far' – people reject interventions because humans should not want to interfere with nature on that level. In the third area of ethical reasoning, people follow a reasoning of broad cost-benefit analysis. If considered in that area, our exemplars tended to be positively evaluated. In Chapter 5, Maarten Jacobs will comment on the research.

In Chapter 6 ('The trouble with plovers'), Anita Guerrini addresses a similar question of naturalness and authenticity with regard to landscape perceptions. She focuses on the role that animals play in popular perceptions of the landscape. The Western snowy plover is a diminutive shorebird classified as threatened by the US Endangered Species Act. The bird provides Guerrini with the basis of a case study of the role played by animals in popular perceptions of landscape. She also addresses the questions whether an environment constructed and managed by humans for the sake of conservation ceases to be natural or authentic. Next, she asks if the conservation and restoration of non-human species requires the absence of humans from the scene. Controversies over the protection of the plover along the central California coast give context to these questions. Henny van de Windt provides a comment (Chapter 7).

1.3.2 Part III: The Genomics View of Nature

Part III of this book addresses some issues raised by the new developments in contemporary life sciences.

In Chapter 8 ('Detachment, genomics and the nature of being human'), Lenny Moss addresses the relation of our visions of nature and of ourselves. According to Moss, our understanding of nature and our understanding of what it means to be human cannot be treated as independent variables – nor does one provide a privileged point of departure for understanding the other. Rather our understanding of each must reciprocally and dialectically inform the other. From an 'anthropological' perspective, he suggests that an idea of 'detachment', that scales with an entity's internal degrees of freedom, can be used to articulate an understanding of nature in which human self-understanding can find its proper place. He then shows how the idea of detachment can provide the means for making sense of the otherwise paradoxical findings of comparative genomics which in turn lends 'detachment'

empirical support and guidance. Finally, the human socio-cultural form of life itself is seen as both driven and made possible by its level of detachment and embedded in species-cosmopolitan ecological regimes of compensation. Pieter Lemmens comments (Chapter 9).

In Chapter 10 ('Metagenomic Metaphors: New Images of the Human from "Translational" Genomic Research'), Eric Juengst claims that, as the international genomic research community moves from the tool-making efforts of the Human Genome Project into biomedical applications of those tools, new metaphors are being suggested as useful to understanding how our genes work – and for understanding who we are as biological organisms. The many directions of this new 'translational' genomic research are producing many different new metaphors, but in this chapter Juengst focuses on one set that seems to be a departure from the essentialistic metaphors we have heard before: a trio of metaphors emerging from the planning of the Human Microbiome Project (HMP). The HMP is a new 'metagenomic' initiative at the U.S. National Institutes of Health to sequence the genomes of human microbiological flora, in order to pursue the interesting hypothesis that our 'microbiome' plays a vital and interactive role with our human genome in normal human physiology. Three metaphors are being widely used by the scientists promoting this initiative: (1) that the human *genome* should be understood as a part of a larger sensory-motor organ, picking up and reacting to cues from its environment much like our nervous or immune systems; (2) that the human *body* should be understood as an ecosystem with multiple ecological niches and habitats in which a variety of cellular species collaborate and compete; and (3) that human *beings* should be understood as 'super-organisms' that incorporate multiple symbiotic cell species into a single individual with very blurry boundaries. Each of these metaphors carries interesting philosophical messages, which Juengst concludes by pointing to as promising topics for future research. John Dupre and Maureen O'Malley comment (Chapter 11).

In Chapter 12 ('Genomics metaphors and genetic determinism'), Hub Zwart shows how our understanding of scientific developments depends on the metaphors that we use. Initially, in presentations of the Human Genome Project (HGP), the blueprint metaphor was a very prominent vehicle of communication. In 1999, for example, Francis Collins, director of the Human Genome Project (HGP) indicated that mankind was about to see 'its own blueprint'. Gradually, however, the drawbacks of this metaphor became evident, notably because it seemed to convey a deterministic view on the relationship between genome and the Self. Therefore, a rival metaphor was presented by Collins and others, in which the human genome was presented as a landscape and the human genome project as an expedition, resulting in a map. Notably, the Lewis and Clark expedition was used as a historical template. Yet, while Francis Collins described the HGP in terms of terrestrial exploration, Craig Venter rather opted for metaphors associated with open water and with exploring the earth as an aquatic planet. In this contribution, these rival metaphors are described and analysed in terms of the dimensions of human genomics that are disclosed or concealed by them. Chung Lin Kwa will comment (Chapter 13).

1.3.3 Part IV: *Philosophy of Landscape and Place*

In Part IV, we will look into recent developments in the philosophy of landscape and place.

In Chapter 14 ('Thinking like a mountain: ethics and place as traveling concepts'), Bruce Janz asks what it would mean if an environmental ethics would no longer be based on the idea that nature should be preserved (in time) but rather on place. Janz starts from the observation that environmental ethical theory has generally attempted to extend moral standing (and/or agency) beyond the human world, to argue for a greater duty on humans to preserve the natural world. Aldo Leopold is often taken as a prime example of the extension of ethics. He extends ethical consideration by maintaining that the central line of moral consideration be extended temporally, that we 'think like a mountain'. Janz argues that, despite the common understanding of Leopold, he is actually offering an ethic of place rather than of time, and one that in fact avoids some problems of temporally based ethics. Drawing from, among others, Deleuze, Mick Smith, and Mieke Bal, he argues for an ethics rooted in place in which concepts 'travel' to new contexts and thus create new ethical concepts. When we regard ethics as rooted in the knowledge of place, and see places as themselves knowing (and which therefore can serve as points of resistance to our knowledge, rather than merely as the content of our knowledge), we can engage in a kind of interdisciplinarity, as our forms of knowledge are critiqued and extended through a close understanding of place-knowledge. From such a perspective, it becomes possible to raise new questions and engage in both moral imagination and 'place-making imagination', that is, the extension of possible forms of ethics and place-making in new ways. Janz presents Leopold as an excellent example of someone whose close place-knowledge is the source of his ethical thought, and the source of a new model of ethical thought concerning nature. Jacque Swart provides him with a comment (Chapter 15).

In Chapter 16 ('Developing nature along Dutch rivers; place or non-place'), Martin Drenthen addresses the question what an ethics of place could mean in the case of water management in the Netherlands. He addresses the question how to provide ecological restoration projects with an appropriate cultural context that enables humans to have a meaningful relation with the land. The attempt to mitigate the effects of increased water discharges due to climate change from a merely functional perspective imposes a purely abstract vision of nature on the land and would eventually imply a transformation of these new landscapes into strange non-places, devoid of meaning and separated from the habitable world. Drenthen considers three alternative interpretations of these 'new nature' projects in terms of place attachment. From the first, restoration is seen as yet another modern attempt to instrumentally rearrange the landscape, that disturbs (or even erases) the different cultural 'textual layers' in the landscape and thus reduces the 'legibility' of the land that enables people to have a meaningful relation to a habitable place. The second reading interprets these restoration projects as experiments in place-renewal, in which the reintroduction of natural dynamics into the river landscape does not wipe out legibility, but on the contrary, brings out deeper 'textual' layers and thus *restores* historical continuity.

Ecological restoration then implies a deeper, ecologically sounder understanding of place that can revitalize place-based communities, and deepens their understanding of what it means to dwell along a river. The third perspective (inspired by the work of Marc Augé on ‘super modernity’) puts forward the rather disturbing question whether our longing for a deeply felt, authentic place attachment (of which before mentioned perspectives are merely symptoms) does itself not in fact risks transforming these very places into theme parks, thus even increasing the actual place alienation. Maybe the only way to be authentic is to acknowledge our lack of any deep sense of belonging. If so, then the feeling of *detachment* itself should guide our interpretation of these new landscapes. Should we not conceive these ‘new wildernesses’ as the most recent ‘inscription’ in the land, both mirroring our fundamental homelessness and enabling us to experience it? Kris van Koppen comments in Chapter 17.

In Chapter 16 (‘Framing and reframing in invasion biology’), Jozef Keulartz starts with the observation that ‘place’ is a contested concept in conservation and restoration. In this chapter he focuses on invasion biology to examine some of the topics related to this controversial concept. The recent emergence of this discipline went hand in hand with heated debates on the so-called exotic species issue. Apparently, these debates have ended in stalemate, with only two extreme positions: nativism and cosmopolitanism. To break up this dichotomy and to give the debate new impulses, Keulartz explores the different metaphors that can be found within the scientific discipline of invasion biology in some detail. He argues that these metaphors, like all metaphors, are restricted in range and relevance; a similar thing can be said about the idea that our relation with nature should be ‘authentic’. According to Keulartz, we should, instead, adopt a multiple vision on metaphor. The adoption and development of such a multiple vision will open up new space for communication and cooperation across the borders between people from different disciplines, and between experts and laypeople. Matthias Gross provides a comment (Chapter 19).

This volume ends with a concluding chapter by Catherine Newell and Mike Osborn (Chapter 20).

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