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What is Wrong with Extinction?

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Contents

1. Introduction

1.1. Background and purpose of the investigation

No one really knows the rate by which species go extinct by the hands of human beings. The estimations differ,[1] but they seem to agree that it is a matter of extreme proportions. According to the Worldwatch Institute, we are now experiencing the worst case of mass extinction since the dinosaurs disappeared 65 million years ago.[2] For most of us, this is a depressing insight and many people seem to agree that to knowingly cause or significantly contribute to the extinction of entire species is (at least prima facie) not only bad. It is *morally wrong*.

For someone with a philosophic curiosity, the question that immediately arises is: 'Why is it wrong'?

Intuitively it seems obviously true that it is wrong, but why is it wrong, and how does it fit with formal ethical theories? These questions are more complicated than they may seem at first glance and they have been the object of a heated debate among both ethicists and environmentalists. This fact alone should be reason enough to pursue the question, but there are other reasons too. The clearness of and the wide agreement about the intuition that what we are doing is at least prima facie wrong, makes the extinction problem an excellent test case that any theory should be able to deal with in order to be taken seriously as a moral theory.

Another strong motivation for studying the question of why it is prima facie wrong to cause extinction is that a better understanding of the ethical aspects of the extinction problem would increase our chances of dealing with the problem. Bryan G. Norton points out that environmentalists often put much effort into trying to explain why a species is instrumentally important for human beings, and they often use different approaches. This is a 'strategy' that usually gives a bad impression however. It also makes it harder to reach the common goal of saving the species.[3] Failures of the environmental movement that can be traced back to the difficulties in agreeing on why different species and ecosystems are important enough for us humans to be worth saving, leads Bryan G. Norton to conclude that we need what he labels "a coherent rationale for environmental protection."[4]

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[1] For some estimations see: Aniansson 1990 pp.21, 25, 65, Bennett et al 2003 p.136, Callicott 1986 p.138, Cooney 2005 p.3, Daily 2000 p.333, Ehrlich & Ehrlich 1990 p.96, 97, 99, Fagerström 2003, Heinzman 1990 p.5, James 2002 p.55, Kellert 1986 p.51, Leitzell 1986 p.250, Lovejoy 1986 p.14, Millennium Ecosystem Assessment 2005 pp.v, 2, 3, 4f, 42ff, Niklasson & Nilsson 2001 p.19, Norton 1986:1 p.120, Norton 1986:2 pp.3, 10, Norton 1987 p.65, Palmer 1995 p.31, Ricklefs 1997 p.597, Rolston 1988 pp.18, 126, 133, 310, Rolston 1994 pp.36f, World Commission on Environment and Development 1987 pp.13, 148, 150, Wramner 1990 p.5

[2] http://www.worldwatch.org/topics/nature 2004-06-04. Bennett et al (Bennett et al 2003 p.136), Norton (Norton 1986:2 p.270) and Whiteside (Whiteside 2006 p.31) reason along the same lines.

[3] Norton 1982 pp.18f, Norton 1984 p.72

[4] Norton 1982 p.20

This is underlined by Lori Gruen and Dale Jamieson who declare that:

> It is ironic that the destruction of biodiversity, which may be the greatest of human crimes against nature, is also one of the least understood. We do not have a good philosophical account of why biodiversity matters, and the steps that would have to be taken to protect it are, in the present climate, politically impossible.[5]

Both Norton's and Gruen/Jamieson's remarks tell us that there is a great deal of work to be done in the field, and they also tell us that the work is very important.

Finally, the problem of human-caused extinction also seems to be a good battleground for the more general question of what should count as criteria for moral standing. Actually, most of the ethical debate surrounding the extinction problem is concerned with this question, and this will also be salient in my investigation.

The present debate around this question is mostly performed in polemic between advocates of holistic theories on the one hand, and advocates of individualistic theories on the other.

The advocates of the holistic approach claim that we have moral duties directly to the species. They are primarily concerned that without a direct moral standing for species we will have to depend on their instrumental value for us humans in order to account for the wrongness of causing extinctions, and they do not believe that to be sufficient.

The individualists on the other hand claim that only individuals can be moral objects. They are sceptical to the holistic approach, and to the possibility of ascribing moral standing directly to species. They especially find it difficult to comprehend how species can have morally relevant interests for us to consider.

This investigation will scrutinise both the holistic approach and the individualistic approaches.

1.2. The investigation

In the first part of the book,[6] I will examine the most common answer to why it is prima facie wrong to cause a species to go extinct, viz. because (and only because) the species is, directly or indirectly, instrumentally valuable to us human beings.

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[5] Gruen & Jamieson 1994 p.334

[6] An earlier version of this part of the investigation has been published under the title: "What is Wrong with Extinction – The Answer from Anthropocentric Instrumentalism" Persson, Erik 2006

I will start with a general account of the idea. Then I will take a closer look at some of the ways in which other species can have instrumental value for us human beings, and at how these values can be expected to stand up in a trade off situation with other human values. I will then go on and investigate two special types of instrumental value that are suggested to be important in our relation with other species.

It is also important not to forget that other species do not just supply us with value individually, but also in virtue of being a part of an ecosystem (or rather several ecosystems) and of the general biodiversity. I will therefore assign a part of the investigation to those kinds of values – called ecosystem values.

Due to the large degree of uncertainty surrounding both the value and the function of species, I will assign one chapter especially to the issue of uncertainty. I will then discuss both the uncertainties as such, and how to deal with them. I will pay special attention to the so-called precautionary principle that has become increasingly popular as a tool for decision under uncertainty, but that is also subject to some serious criticism.

An important part of the problem of extinction is that typically, it is now living human beings who benefit from the exploitation while future generations of human beings have to live with the problems. I will therefore assign a chapter to the question of whether we have a moral duty to preserve species for the sake of future generations of human beings.

As we shall see, many species, as well as a generally high degree of biodiversity, are quite important for both present and future generations of human beings. This instrumental value in combination with our moral duties towards our fellow humans (both present and future) that are affected when species disappear seems to give us quite strong moral reasons to be restrictive in contributing to the extinction of species. This way we can account for a part of why it is morally problematic to contribute to the extinction of other species, but it will probably not give us the whole answer. We seem to need something more to fully account for our moral intuitions regarding human inflicted extinction. We need for example to explain why we should refrain from doing things that contribute to extinction even when we are positive that these things will gives us more value than we lose.

It is therefore necessary to investigate also other theories than anthropocentric instrumentalism in order to gain a complete answer to our question.

The next major contestant I will scrutinise is called *ecocentrism*. According to this idea, we have moral duties to the species themselves. This approach has the advantage that it aims directly at the species instead of depending on the species' value for us, and on human obligations to other humans. It therefore looks like a more promising way of giving a complete account for the moral problems with extinction. It also has its fair share of problems, however, and I will look at some of the most important problems one by one to see if they are real, and if so, how serious they are and whether they can be solved.

When analysing the idea of how species can have *intrinsic value*, we will find that this view might not be best expressed in terms of *moral duties to* the species, but in terms of *end value of* the species *for* human beings. We will thus turn back to the human-centred approach, but this time no longer just in an instrumental setting. By considering the end value of other species for human beings we will get a much more complete understanding of why it is wrong to cause extinction compared to what we could get by just referring to the instrumental value of species for human beings. At the same time we do not have to claim that the species have moral standing of their own.

A clear disadvantage of the widened anthropocentric approach is that we will not be able to explain why it is sometimes considered immoral to contribute to the extinction of other species even when their final and/or instrumental value for us is smaller than the value we can get from the exploitation. In the last part of the investigation, I will therefore widen the individualistic approach further by taking it beyond anthropocentrism and also include other sentient animals among the moral objects. This approach is referred to as *sentientism*. The case for moral standing for all sentient animals is in fact much easier to defend than both the idea that entire species have moral standing, *and* the idea that *only* human beings have moral standing. Nevertheless, this extended individualistic approach also has its share of problems. I will scrutinize some of the most important ones and try to show how they can be solved.

The investigation ends by concluding that anthropocentric instrumentalism does take us a part of the way, but leaves too many questions unanswered. The same goes for the idea that other species can have end value for us humans. Taken together, however, they can take us much further. The idea of moral obligations to species suffers from what looks like insurmountable problems, and can probably not form part of the final explanation. If we combine the idea of instrumental and final value of other species for us – human beings – with moral standing for at least some non-humans in the form of sentientism – we will, however, get a much more defendable, useful and complete account both of the general intuition that extermination is prima facie wrong, and of the dilemmas that we often encounter.

1.3. The inter-disciplinary character of the investigation

It is tradition in the academic world to choose a narrow topic – the narrower the better – and then dig into that topic and dig as deep as one can in order to really understand that particular topic. This goes for philosophy as well as for almost all other academic subjects.

This digging is incredibly important for our understanding of the world and our place in it, but it is not enough. In order to really understand the world we

live in and our place in it, we also have to take the next step and glue all the little pieces of understanding together to get the whole picture. In fact, most of the really important questions in life cannot be answered just by digging in one place. One often has to dig out a whole area, and also place the area one has dug up in relation to many other areas. It is obvious that one person cannot do all the necessary digging by himself. It takes several dedicated teams of diggers to dig a whole lot of holes to get the relevant facts. Even this is not enough however. It also takes someone to connect the facts in the right way to achieve the best possible understanding. This too is a full-time job and a speciality in its own right. Unfortunately it is a task that has been shamefully neglected even by philosophers – the academic discipline that would be the most appropriate to take on this task. This in turn means that the carefully dug out holes and the facts thus collected have not been able to play the role they could have played. In this book I will attempt to make a small contribution to the ongoing campaign to change this. The character of the book is thus to a large degree both multi-disciplinary and inter-disciplinary. The tools used for the connecting work are philosophical but the holes I try to connect can be found in many different academic territories.

In order to get the connections right it is probably necessary to have visited all the holes in order to achieve a satisfactory understanding of the facts. It has been my ambition to do so, and I have worked hard to live up to that ambition. No one person can, however, achieve expert status in all the different subjects needed to answer even a seemingly limited question as the one asked in the title of this book. Neither is it possible to account for all the facts, all the understanding or all the controversies that are dug up from even one single hole let alone all the whole complex system of holes. It is therefore important to discriminate and to choose carefully what to include and what not to include in the answer. Even with hard and dedicated scrutiny there are bound to be things that should have been accounted for but that have been missed out. That is doubtlessly the case also in this book.

Undoubtedly some – both philosophers and scientists – will think that I have spent too little time at their particular favourite hole or even that I should have spent all of my time there. I hope, however, that some of you will think that even though only a small part of all the incredibly interesting things you have dug up have been accounted for in my answer, the total picture that will be presented here, and that it would not have been possible to achieve without moving between different disciplines and sub-disciplines, has a value (instrumental or final) that to some extent can make up for this.

1.4. Acknowledgements

Before I start presenting the investigation I wish to thank everyone who has been involved in the process. Not least my supervisor Dan Egonsson who has read my text several times and bestowed me with much useful feedback. I also wish to thank Agneta Åhs, Jonathan Linné, Johannes Persson, Björn Petersson, Anders Melin, Toni Rønnow-Rasmusen, Roger Fjellström, Robin Stenwall, Lena Wahlberg, Phillipa Smedinge, Dennis Brice and Wlodek Rabinowicz who have all read the whole or parts of the manuscript and provided me with many useful comments. A special thanks goes to the members of the PhD study group at the Lund University Centre for Sustainability Studies, and the philosophy seminar at the Royal Institute of Technology to whom I have presented parts of the text, and whose comments have been very useful.

2. Anthropocentric Instrumentalism

2.1. The standard answer

I have chosen to call the first and most common answer to our question 'anthropocentric instrumentalism'. 'Anthropocentric' because it only considers the value other species have for us human beings, and 'instrumentalism' because it does not conceive of other species as having value as ends, but only as a means to something else.[7]

This answer has historically been seen as the most important, and often the only, reason for conservation.[8] If we scrutinise official national and international policy documents that discuss the issue of species loss, we can see that anthropocentric instrumentalism clearly dominates – when the question of why we should preserve species is at all discussed. In most documents, it is not discussed at all, or just barely. In some cases, the documents explicitly state other reasons than anthropocentric instrumentalism.[9] It is, however, quite clear from the reasoning in the documents that anthropocentric instrumentalism is almost always assumed to be the sole basis for their concern about other species. When other reasons are mentioned, they are with few exceptions only just that, mentioned, nothing more. The discussion, agreements, recommendations, etc. (depending on the purpose of the document) are imbued with the attitude that other species only have value as a means for other things that have value for human beings.[10]

In scientific, educational or advisory articles, or textbooks discussing species loss and/or giving advice on species preservation, the question of *why* we should protect threatened species is in general not discussed. When it is, it is common to talk about "scientific", "biological" or "ecological" reasons. What this means is seldom discussed, but it seems quite clear that these reasons are not conceived of as moral ones. In fact, most authors of this kind of text do not

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[7] Many authors do not acknowledge the possibility that other species can have end value for human beings and therefore use the term 'anthropocentrism' as equivalent to the way I use the term 'anthropocentric instrumentalism'.

[8] Melin 2001 passim, Rundlöf 1999 p.12

[9] Melin 2001 passim Ann example of this is the Brundtland report (World Commission on Environment and Development 1987).

[10] For a more extensive investigation see Stenmark 2000 passim. Stenmark has studied several national and international policy documents and has reached the same conclusion as I have. See also Aniansson 1990 p.123, Barton 1992 p.773, Gamborg & Sandøe 1995 pp.18f and Rolston 1994 pp.24f for shorter discussions. For a historical outlook from a Swedish perspective see Melin 2001 Passim. For examples, see e.g. The Bern convention 1979 pp.2f, Cal/EPA 2003, Interview with EU Commissionaire Margot Wallström in Sydsvenska Dagbladet February 9th 2004 (http://w1.sydsvenskan.se//print/printarticle.jsp?article=10074604), Johansson, Birgitta 2003 pp.3, 8, 28, Millennium Ecosystem Assessment 2005 passim, Various statements by MA board members on the official website of the Millennium Ecosystem Assessment, The Rio Convention 1992 §1 and passim, World Commission on Environment and Development 1987 pp.xiv, 13f, 136, 147ff and passim, The Swedish Environmental Agency web portal on environmental objective 16.

recognise them as value judgements at all. Obviously, they are value judgements, but disguised as scientific statements. The value judgements disguised as scientific statements are sometimes anthropocentric instrumental ("we need to study the species to determine how we can utilise them in the most effective way", "ecology tells us that we need the species in order to survive", etc.). Sometimes the reasons are based on the species end value for human beings ("the species is fascinating in its own right and therefore intrinsically worthy of our attention"), and quite often ecocentric ("we must respect the species for its own sake"). Sometimes the authors contrast their "scientific"(etc.) reasons for preservation with what they call "moral" or "ethical" reasons. Why their own reasons are not moral, and what they mean by "moral" and "ethical" reasons, is not clear though. When they use these terms, they most often seem to refer to the kind of reason for preservation that I will call subjective end value. Sometimes they seem to be thinking of a type of anthropocentric instrumental reason according to which nature or certain species are important for aesthetic, cultural or religious reasons. It is not clear though why these values are seen as moral while the so-called "scientific" (or "biological", etc.) reasons for preservation are not. Sometimes the authors also contrast their "scientific"(etc.) reasons with what they call "economic" or "utilitarian"[11] reasons. These reasons seem to be identical with what I have labelled anthropocentric instrumental reasons. Authors of scientific, advisory or educational texts that discuss the question of why species preservation is important are often very eager to find this kind of "economic" or "utilitarian" motive to justify their work, but it is in general also clear that these are seldom their own motives – at least not primarily.[12]

Finding clear statements from non-governmental organisations (NGOs) concerning why preservation is important has proved to be surprisingly difficult.[13] Most NGOs are of course focused on the means of protection, not the reasons, but it is still rather surprising that they do not spend more energy justifying their work. When they do, the reasons are typically anthropocentric

[11] They clearly do not use the term 'utilitarian' the way it is normally used within ethics, but rather as a synonym to 'instrumental'.

[12] For examples of how these kinds of texts reason around the value of species preservation, see e.g. Aniansson 1990 p.31, Elmqvist & Johannesson 2005 pp.44ff, Farber 2000 pp.s492f, passim, From & Delin 1997 p.5, Gärdenfors 2005 p.120, 126, Ihse 2005 pp.62, 66f, 72, Johansson, Birgitta 2005:1 p.39, Johansson, Maria 2005 p.100, Lackey 1998 pp.329f, Niklasson & Nilsson 2001 pp.19f, Norton 1987 pp.6f, Ricklefs 1997 p.597, Spellerberg14ff, Sörlin 1991 p.175.

[13] I have studied the official internet sites of the following organisations: BirdLife International (http://www.birdlife.org), BirdLife Malta (http://www.birdlifemalta.org), Defenders of Wildlife (http://www.defenders.org), Danmarks Naturfredningsforening (http://www.dn.dk/), Estonian Fund for Nature (http://www.elfond.ee/index.php?keel=inglise), European Centre for Nature Conservation (http://www.ecnc.nl), Friends of the Earth International (http://www.foei.org), Greenpeace (http://www.greenpeace.org/international/), Greenpeace Sweden (http://www.greenpeace.org/sweden), Miljöförbundet Jordens Vänner (http://www.mjv.se), Natur och Miljö – Riksorganisation för miljövård (http://www.naturochmiljo.fi), Norges Naturvernforbund (http://www.naturvern.no), Plantlife (http://www.plantlife.org.uk), Rainforest Action Network (http://www.ran.org), Svenska Naturskyddsföreningen (http://www.snf.se), Svenska Rovdjursföreningen (http://www.rovdjur.se), Sveriges Ornitologiska Förening (http://www.sofnet.org), Taiga Rescue Network (http://www.taigarescue.org), The World Conservation Union (http://www.iucn.org/), Wildlife Trust (http://www.wildlifetrust.org), World Wide Fund For Nature (http://www.panda.org/).

instrumental,[14] but just like in the scientific texts, they sometimes also mention "scientific"/"ecological" etc. reasons for species protection, and now and then they appeal to, for example, "ethical", "aesthetical" or "cultural" reasons, or the "intrinsic value" of nature, ecosystems or species – though without specifying what it means.[15]

Personal experience tells me, however, that many people who are active in NGOs have reasons for their work that go beyond the anthropocentric instrumental reasons that are expressed in official national and international policy documents. Both ecocentric and individualistic non-anthropocentric (i.e. sentientistic,[16] zoocentric[17] or biocentric[18]) reasons are common, as well as reasons that have to do with the attribution of end value to the species.

To summarize: The question of why extinction is a problem is not very deeply discussed among policymakers, or among scientists and NGOs dealing with preservation issues. From what I have found, it seems that both the NGOs and the scientific authors seem to be willing to admit a wider range of reasons for protecting biodiversity compared with the official national and international policy documents, even though the authors of scientific texts are more prone to hiding their own value judgements behind pretended scientific statements. Both NGOs and scientific authors tend ultimately to justify their commitment to saving endangered species by anthropocentric instrumental arguments. I guess that the main reason for this is that this type of argument is assumed to have a greater impact among both the public and the decision makers. That anthropocentric instrumentalism is more commonly accepted among decision makers – at least among the most influential ones – seems to be confirmed by the official national and international policy documents referred to above.

2.2. The right answer?

Sverker Sörlin, who has studied our attitudes towards the environment from a historical perspective, claims that the best reason to believe that we will establish what he calls "a contract with nature" is that the arrogance we have shown towards nature will eventually be detrimental also to our own species and our

[14] See e.g. Aniansson 1990 passim, Dahlerus 2007 p.1, Johansson, Birgitta 2005: 2 p.106f, Lindén 1990 pp.72ff, Olsson 2004 p.43, Plantlife (http://www.plantlife.org.uk), Taiga Rescue Network (http://www.taigarescue.org), Wramner 1990 pp.4, 7

[15] See e.g. Aniansson 1990 pp.16f, 58, 80, 108, BirdLife International (http://www.birdlife.org), Dahlerus 2007 p.1, Johansson, Birgitta 2005:1 p.13, Johansson, Birgitta 2005: 2 pp106f, Olsson 2004 p.43, Wramner 1990 pp.4, 7

[16] Sentientistic ethics assigns moral standing to all and only sentient beings.

[17] Zoocentric ethics assigns moral standing to all and only animals.

[18] Biocentric ethics assigns moral standing to all and only living beings.

culture.[19] Sörlin thus seems to consider anthropocentric instrumentalism the correct – and the most instrumentally useful – answer to our question. He is apparently not alone in this. As we saw in the previous sub-section, arguments that have an anthropocentric instrumentalist character are very common. Among those who write in the field of environmental ethic there is a wide spectrum of different degrees of trust in anthropocentric instrumentalism as a basis for preservation. Most of those who take active part in the philosophical debate seem, however to be placed somewhere along the scale rather than at any one of its end points. Some are more optimistic than others but few believe that anthropocentric instrumentalism can be the whole truth, and no one, even among those who are strongly opposed to the idea that humans are the sole moral objects, seem to deny that human interests play at least some role in accounting for the wrongness in contributing to the extinction of species. [20]

The task in the first part of the book will therefore be to investigate what role anthropocentric instrumentalism can play in answering our main question: "What is wrong with extinction?" To do that, I will start by discussing some different ways in which other species can have instrumental value for human beings, and how these values stand up in comparison to the values we can get by contributing to their extinction.

2.3. Some forms of instrumental value of non-human species for human beings

2.3.1. Food

All our nutrients come from other species directly and indirectly. Most of the species used directly for food are domesticated but wild species also contribute to our food supply. This is especially the case in developing regions, but even the most technologically advanced countries depend in many ways on wild species for their food.[21] All our domesticated species originate from wild species, and some of today's wild species will probably be the basis for domesticated species

[19] Sörlin 1991 pp.273f

[20] For examples of statements regarding the usefulness of anthropocentric instrumentalism in accounting for our moral intuitions regarding extinction, see Leopold 1970 p.246, Luper-Foy 1995 p.91, Melin 2001 p.15, Norton 1984 p.71, Regan, Donald H 1986 p.195, Rolston 1988 pp.127f, 130f, 137f, 313, 325, Schönfeld 1992 p.355, Webster 1992 p.89

[21] Almered Olsson 2005 p. 53, Aniansson 1990 pp.57, 59, 68, Bradley 2001 p.44, Gärdenfors 2005 p.119, Ihse 2005 p.62, Lindén 1990 pp.73, 77, Millennium Ecosystem Assessment 2005 pp.30f, Myers 1990 pp.16, 21f, Söderqvist 2005 p.74, World Commission on Environment and Development 1987 pp.156, 159

in the future.[22] Since it is assumed by anthropocentrism that only human beings have moral standing, the fact that we are killing the proximate source of our nutrients (including killing and eating sentient animals) is not in itself a problem according to anthropocentrism as long as the species continues to exist and supply us with new individuals to eat. This will give us a strong incentive for conserving the species even without involving ethics. Rational selfishness alone is an incentive for conservation. If we also admit the moral responsibility not to deplete the food sources for other human beings, the argument will be even stronger.[23] It also makes the argument more inclusive since we probably need a larger number of species (not just a larger number of individuals of the same species) to supply the whole of humanity with food than we need to satisfy one person. A species that is well suited for being farmed/hunted/gathered/etc. in Sweden may not be equally well suited for the same activities in for example India. Our moral obligations to fellow humans therefore seem to give us a strong obligation to preserve the future supply of a number of species.

This looks promising, but the case is not as simple as it might look. That a species is found suitable as food for human beings has not always been good news from a preservation perspective. We have literally eaten a large number of species to extinction.[24] Considering what we have just said, this looks imprudent or even irrational even from an anthropocentric instrumental point of view and not at all like something that necessarily follows from it, but maybe we do not need to save all the sources of a particular nutrient to secure the supply of that nutrient? Maybe we do not need to save all species that supply us with protein in order to secure our supply of protein, for example? Economically, it may well be rational in many cases to replace natural species with bred or cultivated ones that are more productive and easier to manage (as long as the wild species are not important for other reasons).[25] This means that if we find one species that is a good provider of different nutrients and is easy to breed, etc. we have a tendency to domesticate that species and breed large numbers of it. At the same time other species that play the same role, but less effectively, lose their importance.

It is also argued from an economic perspective that it can sometimes be perfectly rational to deplete a non-renewable resource if we know or at least have good reasons to believe that we can replace it with another resource. It may even be economically *required* to do so if extensive use of the first resource is necessary to drive the economical and technological development that is needed for us to develop the means of utilizing the other resource. This means that the existence of other species that can supply us with the same nutrients considerably

[22] Ehrlich & Ehrlich 1990 p.102, Myers, 1990 p.16, Norton 1987 p.27, Rolston 1994 p.54

[23] It has to be pointed out however, that in the same way and for the same reasons that anthropocentrism provides a stronger incentive for preservation than egocentrism, an even wider account of who has moral standing , ecocentrism or non-anthropocentric individualistic theories, would provide an even stronger incentive for preservation but it would complicate the question of whether it is ethically acceptable to eat the source of the nutrition.

[24] For some examples see e.g. Ricklefs 1997 p.606

[25] Luper-Foy 1995 p.97, Schönfeld 1992 p.355

weakens the argument that we need to preserve any given species as a source of nutrients for human beings.

Over exploitation of wild species is not the only problem. If we find a species useful and want to continue using it, we will probably want to domesticate it.[26] This in turn often leads to problems for other species. The modern intensive agriculture with simplified crop rotations, pesticides and synthetic fertilisers is in fact a major threat to many wild species.[27]

Some of the problems that result from modern agriculture can probably be mitigated by converting intensive farming to organic farming.[28] It will not solve all problems, however. When we domesticate and start breeding a species according to our preferences, we will probably change its genetic makeup (which so far is normally done by selective breeding). The properties that make it more suitable for human utilization may well make the domesticated form less suited for a life in nature. If this is combined with the usual human fear of competition, the result can be that other species including the non-domesticated relatives of the domesticated form are eradicated in order to protect or give room for the domesticated version. This behaviour is quite common and has, for example, resulted in destruction of forests and wetlands to gain land for different types of agriculture,[29] as well as to fierce eradication campaigns against everything from plants and animals competing for nutrients, via plants and animals competing for space, to all kinds of predators that see domesticated animals as easy prey.[30] Domesticated forms of different plants, grasses and animals have taken over large areas of the planet. This has contributed substantially to the extinction of wild species. One illustrative example is when rain forests are cut down to grow soy used as fodder to cattle in order to provide us with meat and milk.[31]

Because of problems like those listed above, some conclude that the economic value of different species for agriculture is not a good basis for protecting natural biodiversity.[32] Since different species inevitably have different degrees of instrumental value for us, an anthropocentric instrumental approach will mean that some species will be favoured at the expense of others. Even if this does not mean that the less valuable species are exterminated, they will be strongly repressed and diminished. The genetic diversity of the species will decrease and the repressed species will risk extinction in the long run.

One good reason for conservation based on our need for food, is that a larger degree of biodiversity among species used for food (both wild and cultivated) increases the food security. If one species is hit by, for example, a disease, we can get the nutrients from another species.[33]

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[26] Rolston 1994 p.144
[27] Angermeier 2000 p.378, van Elsen 2000 pp.101, 103, 106, Hansen et al 2001 p.18, Jamieson 1998 p.46, Midgley 1992:1 p.63, Rolston 1994 p.144
[28] van Elsen 2000 pp.101, 104, 106, Hansen et al 2001 p.18
[29] Callicott 1995 p.30, Carpentier et al 2000 passim, Jamieson 1998 p.46
[30] Almered Olsson 2005 p.57, Ihse 2005 p.67, Jamieson 1998 p.46, Williams 1996 p.169
[31] Almered Olsson 2005 p.57, Callicott 1995 p.30, Jamieson 1998 p.46
[32] Angermeier 2000 p.378, Ricklefs 1997 p.598
[33] Almered Olsson 2005 p.54

Two other important aspects of the "nutrient-track" deserve to be pointed out: As we said in the beginning of this sub-section, all our cultivated species originate from wild species. This means that the larger the biodiversity, the larger the probability that we will find new species that can be useful for us.[34] It also means that in order to find new species to cultivate or to cross breed with our cultivated breeds, or just to transfer genes from, we need a supply of wild species.[35] As an illustration, Norman Myers mentions the great corn blight in the U.S. that destroyed half of their 1970 corn crop. The problem was dealt with by interbreeding the cultivated corn with corn from its original growing place in Mexico.[36]

This seems to be a good reason from the point of view of anthropocentric instrumentalism not to do things that might lead to the extinction of wild species, and may to some degree counterbalance the benefits we get from getting rid of competing species. Another thing we have to consider is that we really do not have any way of knowing today which genetic material will be useful in the future. This can be seen as an argument to conserve species "just in case". I will, however, return to this strategy in chapter 3.

We should also consider the fact that natural evolution goes on all the time, and "invents" new properties in both plants and animals, properties that can turn out to be very useful for us. In order for this evolutionary process to continue, we need to protect not only the species that are potentially useful, but also the ecosystems in which they live and evolve, and other species that may evolve useful traits in the future or just contribute to the selective pressure that drives the evolutionary process.[37]

These last points are of course not just relevant when it comes to food, but also in other cases where nature contributes to human wellbeing. They are examples of so-called ecosystem services. The ecosystem services are important for our supply of food in several different ways. Most pollinators are e.g. wild insects and bats etc.[38] Wild species improve the quality of the soil or help to spread the seeds of plants.[39] A substantial degree of biodiversity is needed to keep the surrounding ecosystems working, to prevent our cultivated species from succumbing to diseases and "pests" etc.[40] Monocultures can be very productive but they cannot sustain themselves for very long without human assistance. They need input of fertilisers and human intervention – generally powered by fossil fuels.[41] The "input" independently of how it is substantiated must come from somewhere and it very often depends on some kind of ecosystem service.

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[34] Norton 1986:1 pp.117f, Rolston 1988 p.6
[35] Almered Olsson 2005 p.54, Aniansson 1990 pp.59, 68f, 124, Johansson, Birgitta 2003 p.8, Myers 1990 pp.16f, Rolston 1988 p.12, Williams 1996 p.169, Whiteside 2006 pp.11f
[36] Myers 1990 p.16
[37] Norton 1986:1 p.117f
[38] Ehrlich & Ehrlich 1990 p.102, Millennium Ecosystem Assessment 2005 pp.25f, Johansson, Birgitta 2003 p.2, Myers 1990 pp.21f, Prance 1990 p.57, Söderqvist 2005 p.75
[39] Johansson, Birgitta 2003 p.27, Johansson, Birgitta 2005:1 pp.8, 12, Söderqvist 2005 p.75
[40] Almered Olsson 2005 pp.55f
[41] Norton 1986:1 pp.129f

The ecosystem services are also important for other things than food and I will therefore discuss them separately and in more detail later.

Before that, I will discuss a couple of other specific uses of other species that might make it important for us, from an anthropocentric instrumental perspective, to conserve the species.

2.3.2. Medicine

Medical benefits are sometimes put forth as an important reason for preservation of species.[42] Many of the medical drugs we use today originate from plants,[43] and most plants have not yet been checked for medically useful substances.[44] This obviously raises expectations about the pharmaceutical treasures still to be found. Even though some economists warn against exaggerated expectations,[45] many are quite optimistic that we will find a lot of new medical drugs among wild species in the future.[46]

Can this account for at least part of why it is considered morally problematic to contribute to the extinction of species? The situation seems to be very similar to the one we just discussed regarding food, and most of the aspects discussed in relation to food are also applicable here. One difference is that even though the human demand for medicine is large, it is probably not as large as the demand for food, which means that both the pros and the cons of referring to medical value are smaller in scope compared to when we refer to the value of species as food as an explanation for why the causing of extinction is morally problematic from an anthropocentric instrumental point of view. Another difference is that even though many medical drugs originate in wild plants, the plants are in general not utilised in the manufacturing of drugs.[47] This means that utilising other species as sources of medicine will not be as exploitative as using them as food.

The continued "invention" of new chemicals in the plant kingdom will be probably be at least as important when it comes to medicine as when it comes to food, which means that the point we made when we talked about food regarding the importance of other species as drivers of continued evolution will be at least as strong when we talk about medical benefits.

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[42] Cooney, Rosie 2005 p.3, Johansson, Birgitta 2005:2 p. 107, Kellert 1986 p.53, Rundlöf 2000 p.13, Sober 1986 p.173, Sprigge 1991 p.109, World Commission on Environment and Development 1987 p.13

[43] Aniansson 1990 p.59, Daily 2000 pp.333f, Ehrlich & Ehrlich 1990 p.101, Fagerström 2003, Garrod & Willis 1997 p.46, Lovejoy 1986 p.17, Ricklefs 1997 p.598

[44] Aniansson 1990 p.59, Rolston 1988 p.127

[45] Garrod & Willis 1997 p.46

[46] Aniansson 1990 pp.59, 68f, Myers 1990 p.17, Norton 1987 p.27, Regan, Donald H 1986 p.195, Rolston 1998 pp.8, 12

[47] Lovejoy 1986 p.17

Medical aspects sometimes point in the opposite direction, however. I pointed out in the introduction that our intuitions tell us that it is *prima facie* wrong to contribute to extermination. This leaves room for saying that there may be cases when it is acceptable or even required to contribute to extermination. This is most salient when we deal with species that carry human diseases, like for instance the black rat (Rattus rattus), the malaria carrying mosquito (Anopheles maculipennis and other species in the Anopheles genus), and of course the malaria parasites themselves (a number of species of the genus Plasmodium) – not to mention several kinds of bacteria.

On the other hand, according to the Millennium report, a larger diversity of wildlife probably decreases the spread of many wildlife pathogens to human beings.[48] If this is correct, it means that even though the battle against diseases can in some circumstances be an argument in favour of exterminating certain species, it can also be an argument in favour of preserving a generally high level of biodiversity.

2.3.3. Materials and fuel

Many of the materials we use in our daily lives come from living organisms.[49] Most notably wood that is used in everything from paper towels to houses, but also plenty of other materials.[50]

Wood and other organic products are also important as fuel.[51] More than half of the fuel used in developing countries comes from wood. In some countries like Tanzania and Uganda, wood comprises four fifths of the fuel. Even in industrialised countries, wood is an important source of energy. In the relatively densely forested Sweden, it makes up 17% of the energy consumption.[52] Bio fuel is a renewable energy source that many people see as an important alternative to the present non-renewables.

In many respects, the harvesting of other species for material or fuel is similar to harvesting them for food. Just as with food, the usefulness of other species as material or fuel for human consumption has in many cases led to their extinction. One difference between using a species for food (and also as fuel) and

[48] Millennium Ecosystem Assessment 2005 p.31, Myers 1990 p.17
[49] Cooney 2005 p.3, Ehrlich & Ehrlich 1990 p.101, Ihse 2005 p. 62, Leitzell 1986 p.245, Myers 1990 p.17, Norton 1987 p.27, Rolston 1994 pp.143f, World Commission on Environment and Development 1987 pp.13, 156
[50] Aniansson 1990 pp.59, 68, Daily 2000 pp.333ff, Gerstin 1990 p. 87, Leitzell 1986 p.245, Myers 1990 p.17, Rolston 1994 p.126, 144, Rydberg 2001 p.1, Söderqvist 2005 p.74, Tucker 1990 pp.46f, World Commission on Environment and Development 1987 pp.4, 155f
[51] Cooney 2005 p.3, Martinez-Alier 1994 p.31, Norton 1987 p.27, Rolston 1994 pp.143f, World Commission on Environment and Development 1987 pp.189ff, 192f Åström 2006 p.3
[52] Millennium Ecosystem Assessment 2005 p.31, World Commission on Environment and Development 1987 p.189

using it for extracting materials, is that once the material is extracted, it can be used for a longer period of time. Once food is eaten or a fuel burned, it is gone and we need a new harvest. One might think that the pressure on the supplying species is smaller when it is used for extracting material, but unfortunately it is not so. The demand for materials that we find valuable is often close to insatiable, and our use of material resources is usually very wasteful. Many species have disappeared and even more are threatened as a result of our "hunger" for materials. The use of wood as paper pulp, timber, etc. has, for example, led to the cutting down of a large portion of the world's forests in general and of the rainforest in particular. The latter is the world's richest ecosystem, and many species have been brought down in the fall. Cutting down the rain forest, both in order to exploit the trees, and in order to make room for other more profitable tree species or for agriculture, might even be the most important cause of extinction today.

Apart from wood, a number of animal and plant species are directly threatened because we value some material they supply. The use of wild animal products is in fact the primary factor behind the endangerment of many vertebrate species.[53] Ivory and rhinoceros horns, for example, have been very popular among human beings. This popularity has nearly caused the extinction of both elephants and rhinoceroses.[54] Some other species have already disappeared as a result of giving us valuable materials.[55]

Maybe this can be explained as an effect of irrationality rather than as something that follows from anthropocentric instrumentalism? A species can supply us with more material in the long run if we are careful not to overexploit it. It therefore looks obvious at first sight that if we value the material we get from a species, it is irrational from an anthropocentric instrumental point of view to let the species go extinct. This is probably a correct observation in many cases. I am not sure, however, that all cases of extinction due to our utilisation of the species can be deemed irrational that easily from an anthropocentric instrumental perspective. We discussed the same problem briefly in the last sub-section when we talked about food and pointed out that there are probably cases where it is in fact rational from a strict anthropocentric point of view to use our sources of nutrient in such a way that some species go extinct. This is probably, at least sometimes, also the case with material and fuel. When the source of a material disappears, the material can often be substituted by another material that does the same job, maybe even better than the original.[56]

The possibility of substituting a resource is an important issue in all cases when a species has instrumental value for us human beings – as food, fuel, material or any of the other instrumental uses we will investigate. I will therefore discuss that aspect a little more without delay.

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[53] Kellert 1986 p.68
[54] Ricklefs 1997 p.599
[55] Prance 1990 p.59
[56] Callicott 1999 p.371, Farber 2000 pp.s495f, passim, Luper-Foy 1995 p.97, Martinez-Alier 1994 p.xxiii, Radetzki 1990 pp.51ff, Radetzki 2001 p.75, SLU 2006:1, SLU 2006:2, SLU 2006:3

The possibility of substituting one material for another is usually overrated by economists since in economic terms, everything is per definition replaceable by the right amount of anything else. One object with the monetary value of 100 krona is per definition replaceable with any object or group of objects with the total monetary value of 100 krona. This is of course not the case in the real world (i.e. the world of physics and biology) were we have to consider other features of an object than just its monetary value. None the less, materials are constantly replaced by other materials, and this is something that has to be accounted for when we decide whether a certain species is expendable from the point of view of anthropocentric instrumentalism. This argument goes both ways, however: It is also possible to substitute material and fuel from non-living nature with material and fuel from living organisms.[57] If we try to consider also future generations, things become more complicated. It is very difficult, not to say impossible, to foresee what material will in the future be substituted by what other material. We can therefore never know if a species that does not seem very valuable at the moment will not turn out to be very valuable in the future.[58]

To this one might of course answer that it does not matter as long as there are other materials we can use instead. In fact, since we have the ability to use materials from the non-living nature, we can always use that ability to substitute a species.[59] We have, for example, already substituted a lot of the wood and fibres we used for a multitude of different things with metal and various polymers. It might also be possible to genetically modify species to produce special materials more effectively than the natural species.[60] On the other hand, we might not know now what materials we will need later. If we let species go extinct now we might also lose features that will be important later, and then we cannot transfer the features to domesticated species. The increasing ability to copy properties from wild to domesticated species can therefore also be seen as an argument in favour of preservation.[61]

The risk of losing existing properties should be complemented by the risk of losing properties before they have even emerged. Nature is very "inventive" and as with medical drugs, it sometimes produces materials that we would not have thought of ourselves, or that would be very expensive to imitate.

The economic value of these materials can probably not motivate a general moral condemnation of activities that might lead to extinction, however, even though it can motivate preservation of some very important species.

Maybe we can single out some important species and grow them in large monocultures? Would not that be a more effective and profitable way of getting hold of the material we need? The economist Marian Radetzki is very optimistic about this possibility.[62] After all, this is exactly what we have done with food,

[57] SLU 2006:1, SLU 2006:2, SLU 2006:3
[58] Lovejoy 1986 p.17
[59] Radetzki 1990 pp.51ff
[60] Fagerström 2003, Radetzki 1990 pp.51ff, Radetzki 2001 p.75
[61] Fagerström 2003
[62] Radetzki 2001 pp.74f

and also in large scale with trees for fuel and material. To suggest that this might work with all the species we need is, however, very ecologically naïve. Species do not work on their own but as parts of a system. A few monocultures clearly work, but only as long as there are natural environments in the vicinity. To substitute all natural environments with monocultures and to let all but the directly useful species go extinct would not work. The question that remains is: How much of the natural environment can we turn into monocultures and how many species apart from the species we harvest do we need? The most probable answer is that we will not know that until we reach the limit and then it will be too late.

Another problem is that humanity is made up by more than 6 billion *individual* human beings – all with their own interests. When all individuals try to do what is best from their particular viewpoint, the result is not always ideal from the point of view of their fellow humans. Take a look at a simple cost-benefit analysis for a project. Suppose it turns out when everything is taken into account that the project will generate an income of $10 000 while the costs will amount to $1 000 000. Is this a good deal? The way I have described it here, it is obviously not a good deal, but let us make a specification: Assume that the income from the project will fall on the decision maker while the costs will fall on the society as whole. Then the part of the costs that falls on the decision maker will be very small in comparison to the gain, and instead of making a great personal loss she will make a personal profit. An act that would look preposterous if all costs were taken into account may well look like a very good deal for the decision maker(s) if the profit falls on the latter while someone else has to pay the price.[63] Unfortunately, this way of making decisions is very common. The Millennium Assessment report on biodiversity for instance points out that many people have gained quite a lot from activities that have contributed to the disappearance of species, including for example forestry and agriculture.[64] It also points out, however, that the gain often comes with a cost that has to be paid by someone else, often poor people, and which is not always factored into the decision.[65] This way of making decisions is in fact very common,[66] and the costs are paid both by other contemporary human beings, by future generations of human beings, and by other species.

Effects that fall upon someone other than the decision maker are usually referred to by economists as *external effects*.[67] The same is the case with effects that are not stated in monetary value. That they are seen as external is of course a result of the perspective we assume when we make the decision – viz. an egocentric economic perspective: Effects only count to the extent that they can be quantified in monetary terms *and* fall on the decision maker. As long as

[63] Millennium Ecosystem Assessment 2005 p.38, Whiteside 2006 pp.35f
[64] Millennium Ecosystem Assessment 2005 pp.5f, 30, 40
[65] Millennium Ecosystem Assessment 2005 pp.5, 30, 40, 80 See also Clarke 1995 p.43
[66] Luper-Foy 1995 pp.96f
[67] Callicott 1990 p.16, Callicott 1999 p.323, Lovejoy 1986 p.21, Martinez-Allier 1994 pp.xi, xxiif, Radetzki 1990 p.13, Radetzki 2001 p.22

decisions are made along these lines, it does not really matter whether it in many or even in most cases of harvesting material, food, medical drugs etc. from other species from an *anthropocentric* point of view would be more rational to preserve the species. The result will still be destruction if that is what gives the largest economic payoff for the individual who makes the decision, i.e. if it is the most rational thing to do from a strictly *egocentric* economic point of view. This may be an important explanation of many environmental problems. For our investigation, it means that many of the problems we have found in this and the preceding (as well as the following) sub-sections may be rooted not in *anthropocentrism* but in *egocentrism*. According to anthropocentrism (the way I use the term in this book), we do have moral duties to our fellow humans, and that is the basic idea behind using anthropocentric instrumentalism as an explanation of why causing extinction is a moral problem. Is it possible that the problems that have been imputed on anthropocentrism are in fact a result of egocentric and not anthropocentric thinking? Egocentrism and anthropocentrism are in my experience often unrightfully conflated in discussions about environmental ethics and the distinction between them deserves to be pointed out. In this case, it is especially important since it means that some of the problems we have found may actually be the result of egocentric rather than anthropocentric considerations, and should therefore not necessarily count against anthropocentric instrumentalism as the answer to our main question.

It is sometimes proposed that the problem of external effects could be dealt with by being better at assigning a monetary value to biodiversity. It has, for instance, been claimed that biodiversity loss in connection with forestry in the tropic regions is at least partly caused by an inability of the markets to account for the benefits of biodiversity.[68]

Sometimes it is suggested that if we manage to assign monetary value to species or to biodiversity as such, the problem of external effects can be dealt with within a system of rational egoism by constructing a system of property rights.[69] I.e. all resources should be owned by someone. Usually, it is conceived of as ownership of land (and water) including animals, plants, etc. that inhabit the area, though the resources can of course also be divided in other ways.

The idea that the problem can be solved by property rights is not universally agreed upon, however – even among economists.[70] Even the most ardent advocates of strict property rights as a solution to the problem of external effects admit that such a system has limitations.[71] One of the problems is that individuals of many species migrate between different areas and different countries. This means that if one individual property owner preserves the individuals while they are on her land, someone else might harvest them when they reach his land.[72] Other problems include for instance that it would be very

[68] Garrod & Willis 1997 p.46
[69] Eliasson 2000:1 pp.128, 135, Radetzki 1990 pp.27ff, Radetzki 2001 p.47, Randall 1986 p.90
[70] Randall 1986 p.80
[71] Radetzki 2001 pp.49ff
[72] Lovejoy 1986 p.24

impractical to distribute property rights over things like species, and that it would probably be considered too unconventional to gain enough support.[73] To come to terms with these problems through a system of property rights would need a system of ownership of individual animals that trumps property rights connected to land ownership.

One problem has to do with specialisation. When a resource is owned by someone who, for example, trades in one particular material, the species is used in a way that best suits that particular interest while other goods and services from the species do not count. This may lead to a higher degree of exploitation compared to a system where many different interests have to co-exist like subsistence farming where the owner has to be self sufficient in all kinds of food, materials etc. that she needs.

Another problem is that some of the goods and services, like the ecosystem services we will look at later, will benefit everyone independently of who owns the species.

There are also other suggestions for how to *internalise* externalities (as it is usually called in economic terminology) apart from strict property rights. Things like laws, taxes, fees, etc. are discussed.[74] Finding the best method for internalising externalities does not have to concern us here, however. What is interesting, given our investigation, is whether any such measure can be motivated from a purely egocentric point of view and still give the same answer to our main question as the wider anthropocentric perspective. It is sometimes claimed that restrictions on our selfish behaviour can be rationally agreed on (at least hypothetically) for purely egocentric reasons.[75] If this claim is correct, the distinction between egocentrism and anthropocentrism is not important – at least when we deal solely with intra-generational relations.[76]

Whether such a system really works, and whether it always or even in general makes it irrational from an egocentric point of view to cause extinction, remains to be shown, however. The idea of rational egoism as a basis for moral principles as such is also very controversial. I will not go any deeper into this debate here since it would take us too far from the main purpose of the investigation. I will just point out some problems that are particularly relevant in connection with our investigation. One such problem is that the way of making decisions illustrated above is very common, and it is hard to believe that it would be that common if it were irrational from an egoistic viewpoint. Another difficult problem is that, even though in the above example it would be more rational to adopt a system that everyone follows as compared to a situation with no agreement at all, it would be even better for each individual to break the agreement: A system where no one generates personal profit in a way that also generates large costs for the rest of society is better for everyone compared to a system where everyone does it. It is, however, *even* better for each individual to

[73] Randall 1986 p.90
[74] Hermele 2002 pp.177, 183, 187f
[75] See e.g. Luper-Foy 1995 p.97
[76] I will return to the question of inter-generational issues in a later chapter.

continue making a profit this way while everyone else does not. If everyone else goes on making a profit on other's expense, it is even *more* important for each individual to go on and make profit any way they can even when it imposes a great cost on others. I.e., we are in a prisoner's dilemma type of situation.

A very important problem surrounding the notion of a contract between selfish individuals is that it presupposes a situation with equal bargaining power. Such an assumption is far from realistic – if nothing else, it is effectively frustrated by evolution. The lack of such equality in the real world is probably an important explanation of why in so many situations it *is* in fact rational for the egocentric to make decisions that imposes the costs on others. This ought to be the case both for those with much power and for those with very limited power. Those with much power can get away with quite a lot without the risk of being subjected to the same treatment. Those with limited power, in some situations, have to disregard the effects on others just in order to survive in the short term. As we will see later, it is also quite clear that this aspect is particularly severe when we deal with inter-generational relations – where the now living have all the power while future generations have absolutely no power.

What all of this has shown us is that it is probably after all often rational from the perspective of a rational egocentric agent with a limited lifespan to engage in projects where the total costs are larger than the total profit, as long as the costs are external while the profit falls on the agent. This in turn shows us that at least some of the problems we have found should probably be imputed to egocentrism instead of anthropocentrism. This is good news for the advocates of anthropocentric instrumentalism as an explanation to why it is morally problematic to contribute to the extinction of other species.

I do not believe that all problems we have found – and will find – can be pinned on egocentrism, however. It would probably be naïve to believe that we could blame egocentrism or irrational behaviour (from the point of view of anthropocentrism) for all cases of depletion of material resources that cause extinction of species even though they could probably be blamed for many.

There is also another important aspect of the relation between egocentrism and anthropocentrism that we have to remember. Even if some external effects can be dealt with within an egoistic framework, the case for conservation would be even stronger if we *also* admitted that we have a duty to consider the interests of other human beings. We therefore have to admit that independently of the problems pointed out above, it is always – for purely numerical reasons – the case that anthropocentrism gives us a stronger reason for conservation than egocentrism. If we allow for duties to other people, the scope will also be wider as I pointed out when discussing other species as source of food, since people have different tastes and live in different environments with different conditions etc. This means that we need a larger selection of species for our consumption.

This important aspect is a double-edged sword, however. It shows that moral respect for our fellow humans does supply us with much stronger reasons for species preservation compared to egoism, but we also have to remember that if we accept that not just human beings, but also non-human species and

individuals have moral status, then we have to admit that even more "payers" are paying even larger costs for our profits (often much larger costs since other species and individuals of other species are more strongly affected). This means that analogously we would find that even in cases where anthropocentrism favours conservation, non-anthropocentrism provides an even stronger argument for conservation. Therefore, if the scenario I have depicted above gives support to anthropocentrism rather than egoism as an answer to why extinction is wrong, it clearly gives an even stronger support to non-anthropocentrism rather than anthropocentrism as an answer to this question.

2.3.4. Indicators

Some species are important as indicators.[77] I.e. they are particularly sensitive to some type of environmental change which if allowed to continue will affect us as well – directly or indirectly via other species or via a dramatic change of the ecosystem.[78] These species can therefore be used as a kind of early warning system (in a way like canary birds were used in mines as indicators of a low oxygen level). This use gives certain species an extra dose of instrumental value for us.

This may look rather cynical and seen in a broader (non-anthropocentric) perspective, it is, but this is nothing we need to worry about for the moment, since we are investigating how far we can get with a purely anthropocentric approach. The conclusion must be that the "indicator-track" is a clear case, although of a limited scope, of value that can be a part of an explanation of why extermination is a problem from an anthropocentric instrumental point of view: It is a foretaste of what will happen to us, and if we do not want that to happen to us we need to do something about the cause of the extinction of the indicator species. If we do not do so we will eventually be harmed ourselves.

2.3.5. Some non-destructive uses

Not all ways of using nature to promote human values are destructive. Non-human species also have instrumental values for us in ways that are best utilised by letting them be. I am thinking of values like (non-destructive) recreation, excitement, inspiration, aesthetic experiences, silence, solitude, psychological

[77] Aniansson 1990 pp.59, 116f, Ricklefs 1997 p.600, Paoletti & Hassall 1999 pp.157, 163
[78] Johansson, Birgitta 2005:2 p.106, Paoletti & Hassall 1999 p.157

amendment, knowledge of how the world around us works, a sense of history, identity, national or regional pride etc.[79]

One could also mention things like religious worship, but I will not include that kind of value in the investigation since I want to avoid grounding the instrumental value of species on cosmologies or views of nature that are not supported by science.

Someone might be tempted to argue that some of the values mentioned above (such as aesthetic value) are in fact end values. I agree that species or members of species can have end value. I will take a much closer look at this type of value in chapter 7. Here, when I talk about aesthetics and other values of the type listed above, what I have in mind is the instrumental value of the species as a means to aesthetic, recreational or other values. A tree as a *motive* for a painting or an *inspiration* for a poem, for example, or an ant as an *object of study* that leads to increased knowledge. The knowledge, the painting and the poem may in their turn have end value and/or instrumental value in relation to something else that has end value etc. Either way, the value of the species is purely instrumental in relation to the knowledge, aesthetic value etc. that we might gain from it.

When the Millennium report talks about spiritual and cultural values, these types of value are not seen as end values. Instead they are seen as instrumental in relation to, for instance, social stability.[80] (It is not clear whether social stability in turn is seen as an end value.) This means that the species have instrumental value in relation to some other instrumental value, which in turn is instrumental in relation to something else, and maybe the chain continues even further.

Can these types of non-destructive utilisation of other species be a part of an answer to our question? It seems quite clear that the values mentioned above are important to people, and it also seems quite clear that nature or different objects in nature can produce these values. Natural environments with much variation seem to improve the quality of human life,[81] and it is well known within environmental psychology that many people prefer environments with elements of nature.[82] In an investigation of attitudes regarding biodiversity among the inhabitants of Kristianstad in southern Sweden, the values I mentioned above turned out to be among the most widely held reasons for protecting biodiversity.[83]

That the values are non-destructive gives them a much stronger position as potential bases for preservation compared to the uses we have discussed in

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[79] See e.g. Anderberg 1994 p.40, Aniansson 1990 p.57, Bradley 2001 pp.43f, Cooney 2005 p.3, Daily 2000 pp 333f, Emanuelsson 2005 pp.140f, Fagerström 2003, Farber 2000 p.s494, Gamborg & Sandøe 1995 p.18, Gustafsson 2005 pp.163f, Gärdenfors 2005 p.119, Johansson, Birgitta 2003 p.24, Kellert 1986 pp.52f, Leopold 1970 pp.264f,269,288, Luper-Foy 1995 p.97, Melin 2001 pp.59f, 142, Millennium Ecosystem Assessment 2005 pp.31f, Norton 1986:2 pp.223, 282, Norton 1987 pp.15, 18, 27, Regan, Donald H 1986 p.195, Rolston 1988 pp.13ff, 22, 127ff, Rolston 1994 pp.8, 9f, 59, 135ff, Sober 1986 p.173, Stenmark 2000 p.34, Söderqvist 2005 p.75

[80] Ihse 2005 pp.65ff, Millennium Ecosystem Assessment 2005 pp.31, 32, Nordlund 2000 Passim

[81] Garrod & Willis 1997 pp.45, 57f, Norton 1986:1 p.129

[82] Johansson, Maria 2005 p.96

[83] Johansson, Maria 2005 p.99

previous sub-sections. Eating an animal means that it cannot be eaten again later and neither can it be enjoyed aesthetically or in some other way after the gastronomic value or the animal has been utilized. If we enjoy the destructive values too much even the basis for renewal, i.e. the continued existence of the species, will be destroyed. This is not the case with the non-destructive uses we discuss here.

I believe that when people criticize instrumental value as a basis for conservation, what they often think about is *destructive* instrumental value. If you use destructive instrumental value as an argument for conservation, what you actually argue for is a more sustainable but still destructive use of the species in question. That is, however, not the case with non-destructive instrumental value. When you use non-destructive instrumental value as an argument for conservation, you have a basis for demanding a more genuine hands-off-policy concerning the species in question.

The line between destructive and non-destructive use is not entirely clear. A utilisation that is non-destructive when enjoyed by one person can become very destructive when enjoyed by too many people.

Even so, if a species is utilised in a non-destructive way, it can be enjoyed more times and by more people. This in turn means that we can get more value out of it in the long run. This is something that talks in favour of prioritising non-destructive uses over destructive uses in cases where we have to choose. On the other hand, there is less demand for the types of values we discuss here compared to other values we have discussed (food, medical drugs, material and fuel). This means that in a trade-off situation, they risk ending up quite far from the top of the priority-list. Things like food, medical drugs, material and fuel are also more basic than aesthetic value, recreation, etc. You can hear from time to time that it is impossible to enjoy a beautiful landscape with an empty stomach. In other words, in order to appreciate more subtle values, you need to first fulfil your more basic needs. This is probably not universally true, but it probably contains at least a large element of truth. This in turn has fuelled a debate about protecting species. It happens, for example, that a preservation project with good intentions ends up as a conflict between the well-off who can afford the "luxury" of protecting aesthetic, historical etc. values, and the less well-off who want to harvest the species for food or fuel, etc. This is particularly salient when the preservationists are Westerners whereas the species they want to preserve are located in the third world.[84] In this situation, the values we are discussing will not easily counterbalance the exploitative interests from a purely anthropocentric instrumental point of view.

Another problem with the kind of values we are discussing here is that they have a tendency to get downplayed or even neglected in trade-offs. Anders Melin distinguishes between two types of anthropocentrism. One that accepts this kind of value (which he calls "non-material values") and one that does not. He calls

[84] Andersson 2005 p.91, Sober 1986 p.191

the former kind "ideal anthropocentrism", and the latter kind "material anthropocentrism".[85]

One reason for why the non-material values tend to get downplayed is probably that they are difficult to quantify,[86] and to assess in monetary terms.[87] This in turn is probably partly due to their relative abstractness: Food or timber is easier to see as a real commodity compared to inspiration or relaxation. I believe there is also another explanation: Things like food and timber are easier to trade since they represent roughly the same value for most people, while the values we are discussing here are more personal.

One way in which the non-destructive values can have economically measurable value and which is receiving more and more attention is in the form of tourism. It has become increasingly clear in most societies that the type of value we are talking about here represents a large economic value through its ability to attract tourists. In the next sub-section, we shall take a closer look at this special case of combined experience-value/economic-value that might help tip the scale in favour of preservation in at least some cases.

2.3.6. Tourism

Tourism is often put forward as an important instrumental reason for protecting species.[88] A species can provide instrumental value for us humans both because it provides us as tourists with inspiration, recreation etc, and because it generates income by attracting others as tourists to our area. The tourist and travel business is the world's third largest branch of business.[89] Nature tourism in turn is one of the fastest growing branches of tourism and is a large source of income in many countries – not least in poor countries or areas.[90] The income from tourism tends to provide a very strong and very direct incentive for protection even for people who would not otherwise care for nature preservation, or would even be against protection of at least some species.[91] This goes for instance for big predators that might be a threat to human beings or their life stock, but that are also very attractive to tourists. In many cases, both these and other animals are actually more economically valuable alive as tourist attractions, than they are dead.[92]

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[85] Melin 2001 p.23
[86] Norton 1986:2 p.274
[87] Ihse 2005 p.70
[88] Andersson 2005 p.93, Hellmark 2004:1 pp.133f, Johansson, Birgitta 2005:1 p.8, Walsh 2004 p.65
[89] Olsson 2004 p.35, Prosser 1995 p.118
[90] Charter for Sustainable Tourism 1995, Hanneberg 2004 pp.59, 63, Hellmark 2004:5 p.51, Lindén 1990 p.73, Ricklefs 1997 p.599
[91] Cooney & Dickson 2005 p.13, Doole 2005, Hanneberg 2004 pp.64, 71, Hellmark 2004:6 p.75, Olsson 2004 p.43, Rolston 1994 p.126
[92] Doole 2005, Hanneberg 2004 p.64, Johansson 2005:2 p.110

Another gain from a protection perspective is that nature tourism might also influence the tourists by increasing their interest in the animals or plants they see (maybe even in species they did not come to see but as a bonus get to see anyway). It might also increase their understanding of the communities in which the species live, and make them more sympathetic towards conservation in general.[93]

There is a risk that tourism also contributes to the destruction, however.[94] That is why some initiatives have been developed to counter the environmental impact of tourism. Both the UN and other organisations have held conferences and compiled policy documents aiming at sustainable tourism.[95] The World Tourism Organization (WTO) discusses the matter actively, and there are several different types of labelling of environmentally friendly tourism – often referred to as "eco-tourism".[96] Obviously, the big bulk tourism can never be in the form of eco-tourism, and even eco-tourism is not without negative impact. Just getting to the destination often requires using plenty of energy, mostly in the form of fossil fuels. This in turn means plenty of pollution including carbon dioxide that increases the greenhouse effect with a tremendous impact on the environment, including on other species.[97]

Setting the standards for what is to count as eco-tourism is not easy, and there will certainly turn up borderline cases where it is difficult to say how much encroachment is acceptable in order to stay in business.[98] It is easy to fall victim to the "salami-principle" – i.e. finishing off the habitat one slice at a time, where every single slice is not in itself a cause of concern, and where it is impossible to say precisely at which slice we have gone too far.

An inherent problem with eco-tourism is that it can never be allowed to be too successful, measured in the number of tourists. With too many tourists, the wildlife experience will inevitably be lost even if the impact on the environment can be held at a low level. It will therefore never be able to include the large masses of tourists.[99] It may, however, be able to influence mass-tourism by showing that it is possible to pursue tourism in a non-devastating form, and by influencing mass-tourism to raise their standards of consideration for the

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[93] Hellmark 2004:5 p.48, Hellmark 2004:6 pp.75f

[94] Delin 1997 p.9, Hanneberg 2004 p.69, Doole 2005, Hellmark 2004:2 p.25, Hellmark 2004:3 p.22, Hellmark 2004:6 p.74, Karlsson 2004 p.7, Leopold 1970 pp.294f, Olsson 2004 pp.35, 38, 42, Prosser 1995 p.119, Rolston 1998 p.8, World Conference on Sustainable Tourism1995, World Ecotourism summit 2002 p.2

[95] Europarc Federation 2002, Prosser 1995 p.119, World Conference on Sustainable Tourism 1995, World Ecotourism summit 2002

[96] Helllmark 2004:3 pp.15ff, Hellmark 2004:6 passim, http://www.ecotourism.org/index2.php?ecotourism_associations, http://www.gdrc.org/uem/eco-tour/eco-tour.html , Karlsson 2004 p.7, Olsson 2004 pp.41f

[97] Hellmark 2004:1 p.134, Hellmark 2004:6 p.77, Olsson 2004 pp.39f. The Québec convention on ecotourism in fact calls for regulatory mechanisms regarding transport in connection with ecotourism: World Ecotourism summit 2002

[98] Doole 2005, Fall, Carl-Axel 2004 passim, Hanneberg 2004 pp.59, 69f, Hellmark 2004:6 p.76, Olsson 2004 p.43

[99] Doole 2005, Fall 2004 p.155, Hellmark 2004:1 p. 134, Hellmark 2004:3 p.23, Hellmark 2004:5 p.48, Hellmark 2004:6 p.77, Olsson 2004 pp.38f, 45

environment, even if their standards cannot be as high as that of certified eco-tourism. Some believe that this might be the most important benefit of eco-tourism.[100]

One problem with tourism as an incentive for protection is that it is selective. Only some species are attractive enough for people to spend money and time to see them.[101] This means that tourism can only account for the instrumental value of a limited number of species. On the other hand one spin-off may, as pointed out above, be that tourists widen their interest to include a larger number of species. Therefore, in order to entice the customers to come back, the enterprises must consider a larger number of species than the original "target species". It is also obvious that the popular species cannot survive in the wild in a vacuum. They need a habitable environment, which includes a large array of other species that thereby indirectly also becomes instrumentally valuable to us.

One risk we have to consider regarding both eco-tourism and other forms of tourism is that the tourists get an oversimplified or maybe romanticised view of the area they visit.[102] The opposite is of course also a risk: That the inhabitants of the area get an overly romanticised view of life in the west by continually seeing rich westerners on vacation.

Apparently, tourism too has pros and cons as a reason for preservation. Like many of the previously suggested instrumental values, it is partly self-defeating in that it will destroy its own basis if it becomes too popular. This is a strong argument for proceeding with caution, but it might not be strong enough in a trade off between non-exploiting (or more correct "less-exploiting") eco-tourism and more exploiting mass-tourism.

The effect on people's minds may be the most important contribution of tourism. This change of mind can, however, go in both directions as we saw. Things and events that have the effect of changing people's minds concerning what they value have been labelled "transformative value" by Bryan G. Norton, and it might play an important role of its own when it comes to accounting for our intuitions concerning extinction. We will therefore devote a section of its own to that kind of value later in the book.

[100] Hanneberg 2004 pp.70f, Hellmark 2004:1 p.134, Hellmark 2004:6 p.75
[101] Ricklefs 1997 p.600
[102] Doole 2005, Hellmark 2004:3 pp.22f, Olsson 2004 p.42

2.4. Trade off[103]

We have seen that many species do have instrumental value for human beings, but we have also seen that it is not always easy to tell whether this value is strong enough to account for the moral indignation many of us feel when our encroachments in nature cause species to go extinct. Encroachments that contribute to the extinction of species are done for a reason, and the instrumental value of the threatened species has to be weighed against the value of the things we will have to abstain from if we are to protect the species. I.e. the instrumental value of a species has to compete with other instrumental values.[104] To complicate things further, the end values for which the species are instrumental also have to compete with other end values.

To preserve species can also be quite expensive – both in terms of expenditure and in terms of opportunity costs.[105] It is at least not inconceivable that the costs for preservation in some instances exceed the gains, especially if we also include lost opportunity value. Even though many of these cases probably can be conferred to short-sightedness,[106] or to egocentric rather than anthropocentric motives as we saw in section 2.3.3, we cannot assume that it is always so.

One environmental philosopher who is optimistic about the possibilities of trade-offs to favour conservation is J. Baird Callicott. He has gone from being a hardcore ecocentrist to being very optimistic about the general possibilities of anthropocentrism to account for the wrongness of extinction. Callicott believes in a win-win relation with nature,[107] and he believes that it is possible to "make a good living" while still being in harmony with nature.[108]

Alan Randall is conservatively optimistic regarding the outcome of trade-offs between human values that favour preservation and human values that tend to lead to the extinction of other species. He argues that cost-benefit analyses[109]

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[103] I am aware of the immense problems of finding a common unit in which to compare different goods. To transform all values into monetary value is something that many economists are working on, not least when it comes to different kinds of value in nature. It is, however, a project that is met by much scepticism. The problems involved are great and I do not take a stand here on whether it is possible to solve them. In this section, as well as in all other cases of comparison between different values, I will just assume that it is possible to compare the end value of different goods on an intuitive level. For discussions about the possibilities of expressing the value of species and other natural entities in monetary terms, see e.g. Garrod & Willis 1997 passim, and Martinez-Allier 1994 pp.x, 148, 208, 216

[104] Johansson, Birgitta 2005:1 pp.8, 14, 17, Melin 2001 p.114, Rolston 1994 p.62, World Commission on Environment and Development p.13

[105] Bodegård 2005 p.22, passim, Stegner 1987 pp.243f, Carlton 1986 passim, Johansson, Birgitta 2005:1 pp.8, 9, Melin 2001 pp.15, 114, Rolston 1994 p.62, World Commission on Environment and Development 1987 p.162

[106] As pointed out by e.g. Ricklefs 1997 p.598

[107] Callicott 1990 p.19

[108] Callicott 1990 p.19

[109] In the cases Randall discusses, benefits are stated in terms of "willingness-to-pay" and costs are stated in terms of "willingness-to-accept".

often turn out in favour of the "pro-environment" alternative.[110] He does not (understandably) attempt to estimate how often this happens, but he draws the relatively modest though very important conclusion that "… commercial interests do not hold a monopoly on economic arguments."[111]

Norman Myers supplies us with a real life example of a fruit called 'durian'. It is native to Southeast Asia, and is said to be most exquisite. It contributes (1990) with $100 million a year to the local economies. The problem is that it is pollinated by one particular species of bat, which is threatened by different kinds of human encroachment. The swamps where the bats find most of their food (apart from the nectar from the durian tree), is claimed for human buildings. Human constructions also threaten the caves where the bats live since the caves are exploited for limestone used to make concrete.[112]

In order then to find out whether the disappearance of the trees and the bats is a bad thing according to anthropocentric instrumentalism, we have to weigh the positive effects of the buildings against the negative effects of losing the durian fruit. The negative effects for human beings are that many people will no longer be able to enjoy this exquisite fruit, and that the local economies will lose about $100 million a year. The positive effects for human beings are not clearly spelled out by Myers, but there ought to be a non-negligible economic gain. People in the area will get access to new apartments, and there will be quite a few more jobs available. On the other hand, there ought to be quite a few jobs that get lost if the durian disappears. Given the information we have got, it is not possible to say what the total result will be. It illustrates, however, that it is seldom obvious whether conservation or exploitation is the most rational option in a particular situation from the point of view of anthropocentric instrumentalism. This is obviously a problem for the usefulness of this theory when it comes to explaining why extinction is generally seen as morally problematic – especially since this intuition often appears as very clear while the outcome of trade-offs are often very unclear.

Some of those who have thought about the subject of trade-offs between preservation and other values are quite pessimistic:

Thomas Lovejoy believes that a choice between the economic value of a particular species and the economic value of an encroachment turning out to favour the species does not happen very often.[113]

Petra Andersson considers it "not unbelievable" that if we cut down the forest of the Parc des Volcans national park in Rwanda, and have it cultivated by human beings, the total sum of happiness would be larger than if we keep it protected.[114]

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[110] Randall 1986 p.95. "Pro-environment" can of course mean different things, but since the paper is about preservation, I assume that the meaning of the term in the context it appears is not totally irrelevant to our question.
[111] Randall 1986 p.95. By 'commercial' I assume the author in this context means something like "exploitative".
[112] Myers 1990 pp.21f
[113] Lovejoy 1986 p.22
[114] Andersson 2005 p.91

Holmes Rolston III does not believe that the commercial value of nature gives sufficient account for the value of nature, and that win-win situations will not always be possible as long as we talk in purely economic terms.[115]

The economist Kenneth Hermele believes that there is an opposition between economic growth and species preservation, at least in a short perspective, but he indicates some pessimism even in the long turn.[116]

On top of that, Bryan G. Norton – who in general is positive towards the idea that anthropocentrism favours species preservation – points out that in a future with more humans, the negative instrumental value of a species that, for example, competes with human beings for food or habitat, will increase and maybe even override its positive instrumental value. Therefore, anthropocentric instrumentalism will, according to Norton, be a continuously weaker reason for preservation.[117]

The scenarios of the Millennium Assessment report on biodiversity show that many of the things we need to do in order to counter human poverty and enhance development, are likely to further impoverish biodiversity.[118] The report indicates that the development paths for relieving today's poverty, hunger and health problems for human beings during the next 50 years also mean continued loss of biodiversity (even though the worst scenario in terms of achieving the human welfare goals is also worst in terms of species loss).[119] This means that in at least some situations where we have to choose between preservation and extinction, the alternative that implies extinction will from an anthropocentric instrumental point of view actually be preferable.

The Millennium assessment group also points out that even though it is often possible for a community to make money through preservation by, for example, ecotourism or a sustainable use of forest products, the communities would in general make *more* money by exploiting the area in a way that can lead to a loss of species.[120] They also believe that if we only consider what they call "utilitarian"[121] reasons for protecting biodiversity, we will actually get by with a lower diversity than we have today.[122] This means that even though we will need some species, we will apparently not need all of them.

The millennium assessors conclude that win-win situations may not be as common as has been hoped for in situations where both conservation and development is at stake. They also tell us that conflict between the two is more

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[115] Rolston 1994 pp.126f, 141, 143f
[116] Hermele 2002 p.153
[117] Norton 1982 pp.18, 21f
[118] Millennium Ecosystem Assessment 2005 p.77
[119] Millennium Ecosystem Assessment 2005 p.15
[120] Millennium Ecosystem Assessment 2005 pp.12, 90 The same thing is indicated by Doole 2005 describing a visit to a Chinese village where the inhabitants have exchanged logging for ecotourism. They manage to make a living from ecotourism but their income had fallen as a result of the change. On the other hand, the number of tourists where growing and the village leader believed that they would gain income in a longer perspective.
[121] 'Utilitarian' in reports like these generally means 'instrumental', and should not be confused with the normal meaning of the term 'utilitarian' in ethics.
[122] Millennium Ecosystem Assessment 2005 p.7

common than interplay, and they finally claim that it would be naïve to believe that we can always have both. The Millennium assessors therefore advise us to think more of how to make trade-offs between development and species protection.[123]

This list of pessimistic assessments concerning the outcomes of trade-off situations shows that we may do well in being careful in what we can expect from anthropocentric instrumentalism as a basis for preservation.

Norman Myers writes that our lifestyle with "cheap supplies of hamburger beef, hardwood timber, and other tropical forest products" is a large threat to the rain forest.[124] This goes not just for the rain forest, but for many other habitats and their species as well. Considering that our demands for food and other utilities from nature historically have been the main cause of human induced extinction (both directly and indirectly through habitat destruction), maybe references to these demands are not the best basis for a defence of biodiversity?

On the other hand, Myers also claims that

> the continuing decline of tropical forests [and we might add other ecosystems and species] will eventually levy a heavy price on our temperate-zone lifestyles, through the loss of many potential sources of new foods, drugs, industrial raw materials, even sources of energy.[125]

This is also an important point that seems to be right in line with the statements by Sörlin referred to in the beginning of this chapter. It also underlines the point we have made earlier that it is not necessarily always the case that our wasteful use of natural resources follows from anthropocentric instrumentalism. On the other hand, we could not exclude that what looks shortsighted and wasteful may in some cases actually be the most rational from a strictly anthropocentric instrumental viewpoint. In order to be able to continue to utilise other species we have to be aware not to use them faster than they can reproduce themselves. If we demand large quantities at a low cost of whatever it is that a certain species supplies, and the species cannot sustain that demand in the long term, we have to ask another question: Is it better to satisfy the demand to a high degree for a short time, or to satisfy it to a lower degree for a longer time? The answer is not as obvious as proponents of a sustainable use of natural resources often assume. It looks quite obvious that the latter option is the best one in the long term especially if the total amount of good we can get from the species in the long term is much larger than what we can get if we choose the more "short-sighted" alternative. If we take the actual behaviour by consumers as an indicator of their interests, however, the answer seems to be that they quite often prefer a high degree of satisfaction of a demand for a short time rather than a low degree of satisfaction for a long time. This could of course be explained by saying that people are irrational, but it might at least to some extent also be

[123] Millennium Ecosystem Assessment 2005 p.74
[124] Myers 1990 p.22
[125] Myers 1990 p.22

explained by the instability of people's preferences – at least of their instrumental preferences. There may be different ways of satisfying our intrinsic preferences, and if the favoured ways of satisfying the consumers' preferences shift – as we know they do – then our case for conservation will turn out to be weak. The durian fruit mentioned by Myers may be exquisite, but there are many delicious fruits, as well as other means of pleasing our taste buds, and human taste tends to shift. So maybe in some situations it is best from an anthropocentric instrumental point of view to get as much as possible out of a species while it is in fashion even if it means that it will disappear eventually. We also have to remember that technology changes. If we do not use a resource now, it might be worthless or at least worth less in the future when the technology has changed.[126] On the other hand, a resource that seems worthless today might become valuable later, and resources that today have an instrumental value of a kind that gives most satisfaction if it is utilised quickly may later turn out to have another kind of instrumental value that would give the most value if it is exploited in a more sustainable manner. This further increases the uncertainty we face when we try to make trade-offs between values that support conservation and values that tend to promote extinction.

One aspect that may be important is that the less common something is, the higher the price usually is. This in turn means that when a species becomes threatened, its market value increases and it becomes more economically worthwhile to exploit the species.[127] On the other hand, the exploitation also often means a larger cost since it takes more effort to collect the last specimens of a species. This is not always true, however. Lovejoy uses whales as an example of this phenomenon, but not all species are scattered over the world's oceans. Technological improvement should not be underestimated either when it comes to increasing our capacity to exploit smaller and more scattered populations.

It seems that the answer to whether sustainable use or fast exploitation of a species is the best option from an anthropocentric instrumental point of view to a large degree depends on the nature of the instrumental value of the species – and especially on whether it is exchangeable. Some demands can only be satisfied in one way. We should therefore distinguish between exchangeable and non-exchangeable instrumental value. Exchangeable instrumental value comes in degrees. The size of an instrumental value is in part determined by the size of the end value it serves as a means to, and in part of how effective a means it is to promote this value, but it is also determined by the availability and effectiveness of alternative means to promote the same end value. Non-exchangeable instrumental value has only the first dimension: Its value is decided by the size of the end value it is a means to.

Some things of course have both instrumental value and end value, and many things have instrumental value in relation to more than one end value. Often we are also dealing with chains of instrumental value. Finally, some (or

[126] Martinez-Alier 1994 p.xxiii
[127] Lovejoy 1986 p.21

most) things seem to have both positive and negative values that have to be weighed together.

The fact that there are non-exchangeable functions does not necessarily mean that there are non-exchangeable species but it is not implausible that there are. To identify the non-exchangeable species will, however, probably be quite difficult and it is uncertain how many species we are talking about. It will certainly not be all species.

One thing that has to be remembered when we talk about exchangeability is that it is not possible to assign monetary value to non-exchangeable entities. To assign monetary value to something implies that we have also decided how many or how much of some other entity it takes to achieve the same value. If we put a monetary value on breathable air, no matter how high, it is always possible to accumulate enough of something that has a lower value per unit but that in sufficiently large amounts can outweigh the value of the air. This would be absurd. If we assign the value of $1 000 000 000 to breathable air we would in fact be able to say that we could substitute the breathable air if we instead manufacture one billion copies of a $1 pen. That would obviously be absurd since, if we do not have any air to breath, we cannot utilise the things we have manufactured anyway and the pen would in effect be worthless. The only thing that could replace breathable air would be something that can produce *the same* benefit, not something that just produces something else of *equal* economic value. It is very unlikely that we could find something that can give us the same benefits as clean air.

This complicates further the already complex process of making a rational trade-off according to the principles of anthropocentric instrumentalism. My points are that it is hard to know the outcome of all trade-offs between acts that preserve and acts that contribute to extinction, and in some instances it might not even be practically possible. When it is possible, we can, however, expect that a number of trade-offs might favour encroachments that contribute to extinction if we look at them from a purely anthropocentric instrumental perspective, even though they intuitively seem at least morally problematic, and often as clearly wrong. This in turn seems to weaken the usefulness of anthropocentric instrumentalism as a way of answering our question.

One thing we have to consider though is that there is no consensus in ethics that the rather utilitarian way of calculating we have used in this chapter is the correct way of making ethical decisions. If we accept a more deontological approach to ethics, we have to consider the fact that sometimes the best total trade-off can imply unacceptable costs to certain individuals.[128] It might, for instance, on some occasions be the case that a project that results in the extinction of a species turns out to give the best total outcome, but also turns out to be a death blow to a small rain forest tribe whose life is dependent on the species. In that case, the extinction might be judged as immoral by a deontological version of anthropocentric instrumentalism even if it is judged as

[128] See e.g. Regan, Tom 1983 p. 286f, 360

morally acceptable or even morally required by a utilitarian version. On the other hand, this argument can sometimes also go in the opposite direction. In some cases, private persons or companies may have to pay a high price for the public good of preserving the species,[129] or it might turn out that a certain insect species supplies humanity on the whole with more positive than negative effects, but at the same time causes great havoc for a local population of humans. In cases like that a deontological ethic based on anthropocentric instrumentalism might in fact be in favour of letting the species go extinct or even of active extermination.

It seems that we have to conclude that it is not possible by means of cost-benefit analyses to say that it is always right to preserve species or that it is always right not to. We clearly have to consider each case separately, and not even in all individual cases will it be possible to answer with an acceptable degree of certainty. As we will soon find out, however, things are even more complicated. There are, for instance, some special cases of instrumental value that are not easily accounted for in a trade-off. In the next two sections we will take a look at two such value types that have been suggested to be important in relation to conservation issues.

2.5. Choice value

The Millennium report points out that the stability of ecosystems is, apart from its other values, also important for what they call "freedom of choice and action", defined as "opportunity to be able to achieve what an individual values doing and being".[130]

Bryan Norton reasons along the same lines as the millennium assessors, but focuses more directly on species. He points out that if we sacrifice a species for short-term gains, we also sacrifice what he calls "future options of the human race".[131]

We can call the type of value that Norton and the Millennium assessors talk about 'choice value' since what is valued in both cases is a larger array of choices. The definition of 'choice value' will thus be: 'The value something has because it increases the array of choices for human beings.' Having a large array of choices can have both instrumental value and end value. For many it seems to have a rather high degree of end value.[132] Here I will mainly discuss choice value as an instrumental value but I believe that what is said can to the most part also be applied on choice value as an end value.

[129] Carlton 1986 passim
[130] Millennium Ecosystem Assessment 2005 pp.19, 25, 30
[131] Norton 1987 p.63
[132] See e.g. Daily 2000 p.335

The value – both end value and instrumental value – of having a large array of choices may be an important reason for why it is seen as immoral to contribute to the extinction of species. Losing biodiversity tends to imply a loss of choices.[133] In agriculture, larger biodiversity among the domesticated species gives the farmers a wider array of choices with regard to future crops. Thereby, the farmers also become less vulnerable to changes, and gain a sense of control. We could argue in the same way concerning most of the usages of other species. A larger selection of species gives us more options to choose from. This is interesting because it gives us a way of dealing with one of the more tricky problems we have encountered in the previous chapters, viz. exchangeability. We noted that there might be non-exchangeable species, and there certainly are non-exchangeable functions, but we have also noted that some goods can be supplied by more than one species, and even that some things (like for instance many materials) can be substituted by non-living substances. We can call this 'the redundancy problem' since it indicates that some species might be redundant from an anthropocentric instrumentalist point of view. If a large array of choices is valuable, however, the redundancy problem will be much smaller. A species that has an instrumental value and is exchangeable will thereby automatically also have a choice value through its contribution to our array of choices. It will therefore never be really redundant even if there are several other ways of getting hold of the same good. If we lose the species, we have still lost choice value. The service can be upheld even if one of the species that supplies it disappears, but our array of choices between different suppliers of the service is diminished. Redundancy will therefore be something positive since it gives us a larger array of choices.

On the other hand, in many cases we lose species because of a process that generates something else that increases our array of choices in another way or in another area. Money is a kind of universal instrumental value. Money can be transformed into many kinds of instrumental or end values. This means that money is, in a way, the "ultimate choice value". This makes money a very difficult competitor in all cases of trade-off when we strive for a large array of choices. In today's society it seems like this particular quality in money – its exchangeability into most other values – has made it the most sought after commodity. We spend most of our lives giving other people what they want in order for us to get, not things we value as ends, but money.[134] We can then exchange the money for the things we want. This looks like a detour, but instead of aiming directly for what we want, we go via money not only because we know that we can get more of what we value by earning more money (we could achieve that without going via money), but because the money represents many different values. If we exchange a horse for a cow we have got a cow, but if we exchange a horse for money we can chose what to buy with the money. We can split it into many small sums and by many less valuable things, or we can save it

[133] Millennium Ecosystem Assessment 2005 p.32

[134] Money can of course be valued as an end but here we will only talk about its instrumental value, and in particular its choice value.

and add to it by selling more horses, and then buy something more valuable. Money is more flexible than goods in that way. By exchanging a service or a commodity for money instead of another service or commodity, we gain choice value. Exchanging goods or services for money has been a manifestly successful way for individuals to increase their array of choices. So successful even, that it has a tendency to make people forget about the areas where our choices get diminished by the process. Sometimes it seems that we are so eager in our hunt for "the ultimate choice value" that we do not notice the end values or instrumental values we lose along the way.

The question we have to answer is if the loss of choice value in the form of lost species is so bad from an anthropocentric instrumental perspective that encroachments that contribute to the extinction of species can be seen as morally problematic for that particular reason. In the light of what I just said about money as the ultimate choice value, it can be difficult to maintain that we, all in all, lose more choice value than we gain by so to speak "transferring species into money".

One thing that talks in favour of our case is the quite obvious fact that in order for money to keep its choice value, the things we like to buy for the money have to exist. The value of money is only as large as the value of the things you can buy with the money. That is why just printing more money only leads to a decrease of the value of the currency. In the same way, the *choice value* of money is only as great as the number of *different things* you can buy with the money. The larger the variety of things we can buy with the money, the larger the money's choice value.

We therefore have to distinguish between (A) situations where I get money from you in exchange for giving you my work or some existing goods or goods that have been transformed in a reversible way – and (B) situations where I get money through an act that leads to irreversible destruction or depletion of something else (like a species). In both cases, I increase the number of options for my own part by getting more money to choose how to spend. The difference is that in (B), I decrease the choice value of money as well as the total choice value for everyone (including me). I take away one thing from the world permanently and thereby make it impossible for anyone to utilise it.[135]

When you make money in a way that causes a species to go extinct, you may gain in net choice value for your own part since the choice value of the money may be larger for you personally than the choice value of the species would have been. You are, however, also decreasing the number of things that the money represents (in the form of choices of food, material, aesthetic experiences, etc.) for everyone. You therefore in one way decrease the general choice value of money by taking away a species. It is my impression that this aspect is often neglected in trade-off situations even when choice value is considered.

Furthermore, when you take away a species you take it away forever. It is sometimes argued that encroachments that destroy nature but increase economic

[135] Adapted from Williams 1969 p.173

growth may not be a big problem since it is always possible to use the money we gain to repair the damage.[136] This is not possible when we talk about extinction, however – at least not yet and it might never be.[137]

There are attempts to resurrect extinct species by cloning, but there has not yet been any success. Even if it does eventually work, there are other problems. Reintroductions of species have a low success rate and are very costly.[138] Even reintroductions of species that are gone from one area but still exist in other areas are problematic.[139] Reintroduction of species that have gone extinct, and therefore have not had the chance to evolve during this time, must reasonably be even more difficult and may even cause new problems. One important problem is that the environment might have changed while the species was gone.[140] The niche that the species occupied might, for example, have been taken over by another species.[141] This means that if we reintroduce a species we are introducing it to a system to which it is not adapted or to a system that is no longer adapted to the species.[142] This in turn increases the possibility that the reintroduction will fail. It also means that if it works, it will inevitably interfere with the new order in the system, and it might affect species that have evolved in new directions after the extinction of the species we want to reintroduce. This in turn evokes new ethical questions. Is it, for instance, ethically acceptable to cause the extinction of one species in order to reintroduce another – even considering that the species that disappears has evolved in a direction it would not have taken without our interference? If the species on the other hand had existed in the environment during the changes, it might have been able to adapt (unless of course the changes went too fast). An important limiting factor is also that cloning is only possible if there is preserved DNA. Another problem is that some species are so to speak "more than their genes". That is to say, some of the information that governs their behaviour (and thereby among other things constitutes their role in the ecosystem) is stored not in their genes but in their brains, and is passed on from generation to generation by the older animals showing the young. This information will inevitably be lost even if the information in the genes can be retrieved.

Depending on what ontological status we give to species, it might in fact also be impossible per definition to revive an extinct species. If we see species as individuals, instead of, for example, classes or natural kinds, a once extinct species will be gone forever even if it would be possible to create an exact replica of the species, just as a dead human being would still be dead even if we could

[136] See e.g. Radetzki 2001 p.87
[137] Ulf Gärdenfors at "Artdatabanken" that compiles the red list for Sweden, clearly denies the possibility of ever getting back a species once it is gone: Gärdenfors 2005 p.120
[138] Leitzell 1986 p.251, Norton 1986:1 p.121
[139] Gamborg & Sandøe 2005 pp.18f, Leitzell 1986 p.251, Slobodkin 1986 pp.237f
[140] Slobodkin 1986 pp.237f
[141] Leitzell 1986 p.251
[142] See Crichton 1991 for a thought provoking fictional illustration of this problem.

take his DNA and make a clone. The clone would have much in common with the dead person before he died, but it would not be the same person.[143]

Because of these and probably also other hitherto unknown problems, reviving species through cloning may never be a real alternative on a larger scale even if it is technically possible. The irreversibility of extinction is thus something we must consider a reality. There is (in general) no such thing involved when we lose money. If we miss an opportunity to make money, we can with few exceptions make money some other time and some other way. If we destroy a species, we can probably never get it back no matter how much money we have.

That a loss is forever seems to be a very important psychological factor when we deal with species extinction.[144] The discussion we have seen here may be one possible explanation.

There is one more thing we have to keep in mind when we talk about choice value: Choice value for human beings is clearly important, but "choice value" for evolution is even more important. If we diminish biodiversity, the evolutionary process will have fewer genomes to "choose" from.[145] This in turn means that we decrease the probability that the particular species with the particular property we need for food or medicine or any of the other uses we have discussed earlier, will turn up. It also means that possibilities for the biological communities to adapt to future changes (human induced or not) will be smaller. The members of some species obviously do not have any choice at all. They are totally dependent on one type of food, host, pollen distributor, etc. Members of other specie however do have a choice. When one or more of the species they utilise disappear, they have less of a choice. This in turn can make things more difficult for them in the long run. The species might become less abundant and they may eventually disappear. If this species is important for us, it means it is also important for us not to diminish the number of choices for the members of the species. We will discuss the matter of ecosystem stability and adaptation soon but before that, we will discuss another type of value other species can have for human beings.

2.6. Transformative value

Bryan Norton distinguishes between strong and weak anthropocentrism. Both are instances of what I would call anthropocentric instrumentalism, but they differ from each other in that the weak version includes a type of value not included in the strong version.

[143] The ontological status of species including the idea that species are individuals will be discussed at some length in section 6.1.
[144] See e.g. Elmqvist & Johannesson 2005 p.46
[145] In this case it is of course not a matter of conscious choosing.

Strong anthropocentrism the way it is defined by Norton sees nature as valuable only to the extent that it satisfies *demand values*. Weak anthropocentrism also admits for nature to have value for us by providing *transformative value*. A demand value is something that can provide satisfaction for a felt preference. Transformative value on the other hand is a type of value that something has when it makes us examine, and possibly alter our set of felt preferences.[146]

To illustrate the concept of transformative value, Norton gives us two examples:

The first example features a teenager who really wants to go to a rock concert, but instead of a ticket to the rock concert, she receives a ticket to a concert with a symphony orchestra. As a result, she becomes very disappointed. The ticket does not represent a demand value for her, i.e. it does not satisfy any of her preferences, and she wants to give the ticket away. After having been persuaded by her parents to attend the classical concert, she acquires a taste for classical music, which continues to give her much pleasure. Thanks to the ticket, she alters her set of felt preferences concerning music from only including rock music to also including classical music. The ticket therefore represents a transformative value for her.

Norton also gives us an example of negative transformative value. This time the example is about a child whose friends are bad for him. The time spent with these people ultimately changes the demand values of the child in a direction that relative to some other basic value is negative for him. It is therefore an example of a negative transformative value.[147]

I interpret Norton's use of the term 'weak anthropocentrism' based on these examples as a kind of anthropocentric instrumentalism according to which nature, other species, etc. have instrumental value for us not just as a means for achieving what we already value, but also as having the potential to change these values. Thereby giving us the opportunity to value different things (that hopefully are more worthy of our preferences), or to value more things. Nature or different species therefore has instrumental value according to Norton not just by satisfying existing preferences but also by supplying us with new ones.

Melin agrees with Norton that there are other values in nature that do not appear at first sight. He does not approve of the concept of *transformational value,* however. He does not agree that this is a special type of value that nature has due to its ability to change our preferences. Instead, what happens according to Melin is that *we* change our preferences, which in turn increases the value of nature.[148]

I beg to disagree with Melin on this point, however. I believe that in many cases of changed preferences it is not something we choose to do but something that happens to us – imposed on us from the outside by the experiences that nature (for instance) causes us to have. Even when we want to change our

[146] Norton 1987 pp.9ff
[147] Norton 1987 pp.10f
[148] Melin 2001 p.142

preferences, we often need some kind of input from the outside for the change to happen. It is probably rare that someone manages to change his preferences just as an act of will. In order to make a genuine change we seem to need some kind of imprinting experience. I therefore think it is appropriate to talk about things that can help us with this transformation as having transformative value.

Another possible objection to Norton's idea is that if we can show that a transformation is for the better, then we should not need to take a detour via an experience. We could use the proof directly. If we cannot show that the transformation is for the better, then we do not know if the transformative value is positive or negative.

Let us again look at Norton's examples. According to Norton, the transformation in the first example was for the better and in the second example it was for the worse. If we can know that a taste for classical music is good, then why is this not enough to adopt this taste? Why did she have to actually listen to a concert in order for the transformation to take place?

I believe that the main answer to this objection is the same as the answer I presented in relation to Melin's objection above. I.e. it is in general not enough to show theoretically that a transformation would be for the better – in most cases we need to be exposed to some kind of emotional experience to really change our preferences. I believe, in fact, that our attitudes towards the environment are an excellent example of this.

There is, however, also another problem. In the objection above I assumed that we can know whether a transformation is for the better. It is not quite clear what this means. According to Norton the transformation in the first example above is better because it promotes a value that is objectively better, while the transformation in the second example is negative because it promotes a value that is objectively worse. He fails, however, to give a satisfying answer to why the transformation in the first story is objectively better while the transformation in the second story is objectively worse. Melin makes an attempt by interpreting Norton's notion of objectively better values to mean values that are *considered felt values* and not just *felt values*, and therefore fits better with the general worldview including other preferences of the person who has the value.[149] Negative transformational value is thus presumably transformations that create felt values that fit less well with the worldview of the valuer. This seems like a plausible interpretation. It also has the advantage that we do not have to resign to objective values, or to meta-values.

I would also like to suggest two more specific ways in which a transformation can be for the better.[150] They are based on two distinctions that are easier to make than a general distinction between positive and negative transformative value, but they are none the less important for our investigation. First I would like to distinguish between 'less-intrusive transformative value', and 'more-intrusive transformative value'. I will let the former term refer to transformations where the new set of preferences is overall less intrusive than the

[149] Melin 2001 p.142

[150] I do not believe that these suggestions contradict Melin's suggestion.

set of preferences held before the transformation. For instance because a new preference is formed that is of a kind that is non-intrusive, or at least has a low degree of intrusiveness, or because more intrusive preferences are transformed into less intrusive preferences. By the 'more-intrusive transformative value' I will mean a transformation in the opposite direction. The idea is that demand values that are less intrusive on other demand values – including the demand values of others – are better than more intrusive demand values. This can be defended from a utilitarian standpoint since they allow more value to exist simultaneously and thereby maximises the sum of good. It can also be defended from a deontological standpoint since non-intrusive values break fewer rights. For us it means that a species has a less-intrusive transformative value if experiencing the species inspires people to enjoy its non-destructive values rather than its destructive values, something that seems rather plausible.

The other distinction I would like to suggest is between 'expanding' and 'reducing' transformative value. I will use the former term to mean that the valuer is transformed into valuing something she did not value before and the latter that the valuer is transformed into not valuing something she valued before. This means that additive transformative value increases choice value while subtractive transformative value decreases choice value – not by changing anything in the world outside the valuer but by transforming the valuer. The example of the teenager who acquires a taste for classical music in addition to her previous taste for rock music seems to be an example of this kind of transformation. As we will see soon, this distinction is quite important for our use of transformative value as a basis for preservation.

By including transformative value in the realm of anthropocentric values, Norton hopes to be able to increase the use of anthropocentric arguments in favour of preservation. Others seem to believe in the opposite effect. Thomas Anderberg and Marian Radetzki do not use the terminology introduced by Norton, but they still seem to be thinking of something similar to the transformative values identified by Norton. Both Anderberg and Radetzki believe that lack of the things we value in nature will transform our preferences so that we in the end will not miss them but rather be glad that they are gone and replaced by whatever we have got instead.[151] Future generations might e.g. according to Radetzki acquire a taste for the barren artificial environments they may have to live in and eventually even come to prefer that type of environment to the natural environment. In order to support his assumption, he points out that many people today prefer swimming pools to the ocean even at seaside resorts, despite the water in the ocean being as clean as the water in the pool.[152] One might also add that the number of people who spend their time off at a shopping mall is much larger than the number of people who spend it in the nearest public wilderness area.

[151] Anderberg 1994 pp.41, 111, 115, 120, 122f, Anderberg 1995 p.48, Radetzki 1990 p.55, Radetzki 2001 p.79
[152] Radetzki 1990 p.55, Radetzki 2001 p.79

I am not convinced that this really grants the conclusion, however. The facts seem undisputable but the logic is not convincing.[153] Even if many people today actually prefer the barren monocultures of a modern city, they might, in the same way be able to learn to appreciate a richer environment with larger biodiversity if they became exposed to it in a proper way and were provided with the basic understanding of biology that makes it possible to get more pleasure from the experience. This is in fact parallel to Norton's example: Most young people today would not freely go to a classical music concert, but if they were exposed to it and got to learn about it, many of them might acquire a taste for this kind of music and as a result have a wider selection of music to enjoy. The thing is that if you start appreciating other species, you do not have to stop enjoying the pleasures of modern civilisation. In the same way, by getting access to the latter, you do not have to give up the former. By learning to appreciate both, you will rather have more things to appreciate. We therefore have a case of what I above chose to call 'expanding transformative value'.

Anderberg's and Radetzki's argument seems to rest on the assumption that we can transform *away* preferences and, so to speak, "get over" things we do not have access to anymore. It therefore seems to be a typical example of 'reducing transformative value'. Both directions are probably possible also in the case of biodiversity, but Norton's direction seems more enriching while Anderberg's and Radetzki's seem to make our lives less rich. Even if we learn to appreciate what we have got, it seems quite clear that it would be even better if we got more to appreciate.

All in all it seems clear that with more diversity we can learn to appreciate more things and therefore have a richer life, as with the teenage girl in Norton's example who learned to appreciate both rock and classical music. Anderberg's and Radetzki's reasoning might be of some comfort if we lose diversity, but Norton's reasoning shows us that more diversity is still better. This ought reasonably to count for biological diversity as well as for diversity in musical styles.

Both the expanding transformation and the less-intrusive transformation is something that increases value. We can therefore conclude that if species have the ability to transform our preferences in these directions, they have a kind of instrumental value that is quite important and that has to be added to the other forms of instrumental value that we have listed. That species have the ability to transform our sets of preferences in an expanding direction as well as in a less-intrusive direction seems to me very plausible.

[153] Kenneth Hermele (Hermele 1995 p.72) is not convinced about the facts either. He believes that the reason why people prefer the artificial environments is that the natural environments have been polluted or otherwise degraded by the economic activities that made it possible to build the artificial environments. He undoubtedly has a point in this though the point of transformation still stands.

2.7. Ecosystem services

In this section I will take a closer look at the indirect instrumental value species have due to their role in the ecosystems that they are a part of. Ecosystems supply us with a substantial set of services.[154] These services are often referred to as "ecosystem services" and some of them are extremely important.[155] The ecosystem services include regulation of the oxygen content in the atmosphere, running of the water, coal, nutrient, and other cycles, photosynthesis, pollination, seed dispersal, pest control, regulation of the climate, keeping the soil productive, taking care of waste products, etc.[156] It is quite clear that we as human beings to a large degree are dependent on biodiversity in general, and on some species in particular to uphold the ecosystem services. The coral reefs alone are said to provide ecosystem services amounting to hundreds of millions of dollars by providing habitats for fish, cycling nutrients, protecting human settlements against waves etc.[157] Some calculations indicate that the economic value of ecosystem services is twice the size of the world's total GNP.[158]

The climate, to take one example is affected in many ways by biodiversity, especially by trees. Many trees are very "thirsty" organisms, which means they play an important role in the water cycle. Through their roots, the trees draw a lot of water from the ground – water that is then evaporated into the atmosphere.[159] Cutting down trees can mean drought in some places, and flooding in others.[160] Ehrlich and Ehrlich mention drought in Rwanda and Egypt, and flooding in India and Bangladesh as results of deforestation.[161] Trees also bind large amounts of carbon, which means that they play an important part in regulating the amount of carbon dioxide in the atmosphere. This in turn means that trees are important in regulating the greenhouse effect and thereby the climate.[162] They also contribute to climate control in other ways. The leaf surface, for instance, affects the amount of sunlight that is reflected back from the earth.

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[154] Cooney 2005 p.3, Norton 1986:2 pp.269, 273, World Commission on Environment and Development 1987 p.147

[155] The term 'ecosystem services' is sometimes used in a way that covers all services we get from nature. I think, however, that it is useful to distinguish between the services and goods we get directly from the species and the services we get from the system – even though there is a large grey zone.

[156] Andersson 2007 p.7, Bostedt 2005 p.204 Cooney 2005 p.3, Daily 2000 pp.333ff, Ehrlich & Ehrlich 1990 pp.99, 102f, Elmqvist & Norberg 2005 p. 32, Emanuelsson 2005 p.141, Fagerström 2003, Farber 2000 pp.s494f, Gärdenfors 2005 p.119, Johansson, Birgitta 2003 pp.2, 24, Johansson, Birgitta 2005:1 pp.8, 236, Kellert 1986 p.53, Lovejoy 1986 pp.17f, Leitzell 1986 p.246, Luper-Foy 1995 p.97, Millennium Ecosystem Assessment 2005 passim, Norton 1986:1 p.128, Norton 1986:2 p.273, Prance 1990 p.64, Rolston 1988 p.3, Rolston 1994 p.134, Söderqvist 2005 p.75, Whiteside 2006 p.31, World Commission on Environment and Development 1987 pp.5, 136, 147

[157] Millennium Ecosystem Assessment 2005 p.25 See also Lindén 1990 p.73

[158] Gärdenfors 2005 p.119

[159] Millennium Ecosystem Assessment 2005 p.29, Myers 1990 pp.17ff

[160] Ehrlich & Ehrlich 1990 p.103, Lovejoy 1986 p.15, Myer 1990 p.19

[161] Ehrlich & Ehrlich 1990 p.103

[162] Walsh 2004 p.65

We could go on for quite a long time listing ecosystem services from trees, but to sum it up, we can without any doubt conclude that trees are very important for many climate functions, and thereby for human life as we know it.

The same type of reasoning can, in different degrees, be applied to organism after organism. The ecosystem services are in general as basic and as important as food, and are probably more important than many of the other uses we have discussed. Among the ecosystem services are the basic life enabling services like photosynthesis and the circulation of nutrients without which our kind of life would be impossible.

In fact, our wellbeing is more dependent on the biotic community than many people are aware of.[163] Some authors, in fact, recommend that we consider the instrumental value of other species *primarily* in terms of ecosystem services rather than as suppliers of different kinds of goods.[164] For instance, Bryan G. Norton suggests that the goal of species preservation should be "conceived as the goal of protecting total diversity".[165] He even argues that the value all species have by being part of the total diversity is sufficient for seeing them as worthy of protection.[166]

He is not thereby denying that different species also have their own instrumental value for us because of their particular features, but he sees this almost as a bonus – a value that can be added on top of the general value the species has as being a part of biodiversity.[167] Apparently, by taking departure in total biodiversity, Norton wants to lay a ground ensuring that all species have at least a basic equal value that we can set against the value of other human projects that might be detrimental to one or more species. The "bonus" value that many species have on top of that just strengthens its position in relation to other human values even further.

When we talk about ecosystem services, we should not forget that evolution itself is a kind of ecosystem service. The natural evolution goes on all the time, and "invents" new properties in both plants and animals, properties that can turn out to be very useful for us. A large number of species also increases the chance of finding new useful species.[168] This means that all species contribute to biodiversity in two ways: Directly by being a part of the diversity, *and* indirectly by interacting with other species and thereby contributing to their survival and evolution.[169] When a species goes extinct, it therefore also means a change in the evolutionary process since it affects the selection pressure on the remaining species.[170] In order for this evolutionary process to continue, we need to protect not only the species that are potentially useful, but also the ecosystems in which they live and evolve, as well as other species that may evolve useful traits in the

[163] Lovejoy 1986 p.24
[164] Bandyopadhyay & Shiva 1990 pp.68ff, Prance 1990 p. 64
[165] Norton 1987 p.34
[166] Norton 1986:1 p.111
[167] Norton 1987 p.35
[168] Norton 1986:1 p.128
[169] Norton 1986:1 p.127
[170] Vermeij 1986 p.40

future or that just contribute to the selective pressure that drives the evolutionary process. As Alan Randall points out, we could talk about preservation of *evolutionary processes* just as we talk of preservation of *species*.[171] This kind of ecosystem service is seldom mentioned, but should not be underestimated.

Norton reasons along these lines when he points out that species with no direct instrumental value may still be indirectly useful by just contributing to the evolution and thereby to the emergence of new species that may be useful in a more direct way. His idea is that diversity contributes to diversity, and at least some yet to be evolved species will be useful for us. Therefore, all species are important by merely being part of the competition that drives evolution and contributes to future diversity.[172]

One important conclusion one might draw from this reasoning is that it is therefore not enough to preserve a species in just one of the areas where it occurs, or in a zoo or a national park. It is important to preserve it in every ecosystem in which it plays a part.[173] Even if a species is not globally but only locally extinct, the humans living in the area where it is gone still suffer the consequences of living in an environment with lower biodiversity.[174] Ulf Gärdenfors from "Artdatabanken"[175] makes an analogy with human professions. It is good that we have physicians but is not enough that they exist *somewhere* in the world. We need physicians in *every* area where people live.[176]

It has been suggested that we might be able to replace some or even all ecosystem services by artificial means just as we can replace, for example, some materials with materials from non-living nature.[177] This is probably not the case with most ecosystem services. It seems in fact to be an important feature of ecosystem services that they are typically non-exchangeable.[178] Lovejoy contends the weaker but probably sufficiently strong idea that to artificially maintain the ecosystem services by a human design would take a planning effort that is totally overwhelming both scientifically and socially, and that will not be possible in the near future.[179]

Exchangeability was one of the things that posed a problem for the anthropocentric instrumental approach when we discussed the use of other species as resources.[180] The fact that this does not apply to the same degree to ecosystem services makes them a stronger basis for preservation according to anthropocentric instrumentalism than is the case with many of the other areas of use. To take away an irreplaceable service ought, in short, to be more wrong

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[171] Randall 1986 p.100
[172] Norton 1987 pp.61, 63
[173] Lovejoy 1986 p.23
[174] Gärdenfors 2005 pp.116, 118, Norton 1986:1 p.121
[175] The Species Information Centre at the Swedish University of Agricultural Sciences.
[176] Gärdenfors 2005 p.118
[177] Farber 2000 pp.s495f, passim, Radetzki 2001 pp.43, 75, 77f, Schönfeld 1992 p.355
[178] Angermeier 2000 p.377, Daily 2000 p.334, Ehrlich & Ehrlich 1990 p.102
[179] Lovejoy 1986 pp.20f
[180] This problem was at least partly mitigated by the choice value the species have because of their exchangeability.

from an anthropocentric instrumental perspective than to take away something that can be substituted.

However, even though the ecosystem services are in general not exchangeable, some of the species that make the ecosystems work might be exchangeable. Let us return to the trees for a moment: Trees are important, but there are many tree species, and there is a lot of overlap in their ability to provide different ecosystem services. This means that even though we need trees to regulate for instance the climate, we probably do not need all existing tree species for this purpose. In fact, since some species are better at this than others, this particular ecosystem service could provide an argument to cut down trees of less effective species and substitute them with trees from the more effective species.

Things are not that simple, however. There are many different types of environments on the planet and not all tree species thrive in all types of environment or play exactly the same roles in all types of environment. This means that even if we do not need all presently existing tree species for climate regulation, we definitely need a fair number of them. To this we should also add that species depend on other species for their continued existence.[181] Some tree species, for example, depend on other tree species. In Sweden, The Pedunculate oak (Quercus robur) depends on The Norway Spruce (Picea abies) to be able to propagate: The oak propagates by acorns that grow after they have been hidden by the Eurasian jay (Garrulur glandarius) who use them as winter food but sometimes forget where they have hidden the acorns. If the acorn is not buried, it will probably be eaten by squirrels (Sciurus vulgaris), deer (different species of Cervidae) or mice (different species of Muridae) before they get the chance to grow. The jays, in turn, do not nest in oak trees but need thick spruce forests to nest, so therefore the spruce is important for the oak.[182]

We also have to remember that trees play a role in many ecosystem services – not just climate regulation – and they played a large role in many of the previous discussions, (see the sub-sections *Food*, *Material and fuel*, *Medicine*, and *Tourism*, not to mention *Some non-destructive uses of other species* above). The tree species that have the highest instrumental value for one particular service are not necessarily the same species that best performs another particular service. Some species are very important in some ecosystems but not in others.[183] We will therefore still need quite a large selection of species to fulfil the different roles. It has also turned out that monocultures are not very sustainable, which means that we need more than one species for each type of ecosystem. Actually, we need quite a lot of species to get a working ecosystem – and not just tree species. Trees are heavily dependent on pollination, seed dispersal (see the example above that not only tells us that oaks depend on spruce, but also that oaks depend on jays), micro fauna in the soil, fungi that live in symbioses with many trees, etc. In short, to secure the ecosystems services, we need species that

[181] Gärdenfors 2005 p.116
[182] Johansson, Birgitta 2003 p.27, Johansson, Birgitta 2005:1 pp.8, 12, Söderqvist 2005 p.80
[183] Daily 2000 p.336

are not directly involved in the services in question, but that are necessary for the system to work. Agriculture has showed us that even though monocultures can be very productive, they cannot sustain themselves for very long without human help. They in fact depend on the ecosystem services they are replacing.[184] Thus, the function of things in nature tends to depend on there being other things functioning in a certain way.[185] This should not be a surprise since the properties of different species have evolved as a result of interplay with the environment in which they live. There seems in short to be a very intricate web of dependency relations where species depend on each other.[186] This means that we also have the problem of what we might call "domino effects". One extinction can lead to another and then to a third and so on.[187] This means that every loss will increase the probability for further losses.[188] The disappearance of one species can thus have quite large effects and a small change of the ecosystem might lead to a bigger change in the long term. This means that even if the species that goes extinct as a result of our actions is not useful for us per se, it can cause another species that *is* important for us to going extinct further down the line as a result of the first extinction.[189] In general we do not have enough knowledge about the connections in nature to say that the extinction of a certain species will not lead to such a downward spiral of extinction.[190]

Norton also argues that even though most cases of dependence are not absolute, a loss of species makes the system less stable, and often involves a decrease in the population of the dependant species, which makes it more vulnerable to environmental changes.[191] This in turn can affect other species and may eventually push some species over the edge.[192] For instance, when deforestation affects the water cycle this may lead to further extinctions.[193] In a simulation performed by Plotnick & McKunney 1993, the result was even worse. It turned out that an ecosystem could, depending on the relative rates of speciation and extinction, fall into a situation where the death of a single species could lead to a mass extinction.[194]

According to many biologists and environmentalists, a larger biodiversity in general tends to increase the stability or the resilience of the ecosystems, while a lower biodiversity in the same vein decreases the stability or resilience.[195] According to one study by David Tilman and J.A. Downing published 1994,

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[184] Norton 1986:1 pp.129f
[185] Bandyopadhyay & Shiva 1990 p.77, Myers 1990 pp.22ff, Prance 1990 p.64
[186] Leitzell 1986 p.246, Norton 1986:2 p.274
[187] Norton 1986:1 pp.114ff, Vermeij 1986 p.40
[188] Norton 1986:2 p.274
[189] Norton 1986:1 p.118
[190] Norton 1987 p.62
[191] See the reasoning on choice value for other species above.
[192] Norton 1987 pp.62f
[193] Lovejoy 1986 p.16
[194] Kaufman et al 1998 p.522
[195] See e.g. Aoki & Hamamatsu 2001 p.65, Cooney 2005 p.3, Elmqvist & Johannesson 2005 p.47, Ihse 2005 p.64, Johansson, Birgitta 2005:1 p.41, Norton 1986:1 pp.122f

spots with a larger number of species had a higher resilience against drought.[196] Another study by Tilman from 1996 indicates the same thing.[197] Marine biologists Thomas Elmqvist and Kerstin Johannesson claim in a paper from 2005 that it is becoming increasingly clear that the loss of biodiversity is a threat to the production of food and different materials *but also* to the supply of ecosystem services.[198] They refer to reports from several European studies that indicate that larger biodiversity means increased biomass production (and thereby to a larger amount of coal bound by the trees which is important for counteracting the increasing greenhouse effect), smaller leakage of nutrients from the system, smaller risk of invasion by alien species, and larger stability over time.[199] They are not sure, however, if the results can be generalised to the majority of the earth's ecosystems.[200] They also mention the existence of several cases where ecosystems have "flipped" (changed dramatically), and where decreasing biodiversity has been part of the cause.[201] It is considered beyond doubt that biodiversity is important for the marine ecosystems but biologists are not sure precisely how.[202] Elmqvist and Johannesson claim that more species makes the ecosystem more stable,[203] though Johannesson believes that far from all existing species are necessary for the ecosystems to work.[204] In an investigation of aquatic trophic systems, Ichiro Aoki and Takahisa Hamamatsu show that an increase in biomass diversity (which is not strictly the same as species diversity although they often coincide) in aquatic ecosystems increases the whole systemic stability,[205] but point out that most investigations regarding the relation between diversity and stability only deal with one trophic level (in general herbivorous societies), and that we still need more thorough investigations of the relation between diversity and stability in whole systems involving different trophic levels.[206] In a simulation study performed by Kaufman et al, the authors conclude that the best strategy to optimise the chances of survival for all species is to preserve a high degree of diversity.[207]

The greatest importance of species richness when it comes to ecosystem services are, according to some sources, to be found in its contribution to the long time stability and resilience of the ecosystems.[208] Other sources deny any connection between species richness and stability, while some even claim that there is a negative connection. It is, for instance, pointed out by some authors that the high degree of specialisation in ecosystems with many species means that the

[196] Referred to by Ricklefs 1997 p.599
[197] Tilman 1996 pp.254ff
[198] Elmqvist & Johannesson 2005 pp.49f
[199] Elmqvist & Johannesson 2005 pp.47f
[200] Elmqvist & Johannesson 2005 p.48
[201] Elmqvist & Johannesson 2005 pp.48f
[202] Johannson, Birgitta 2003 p.22
[203] Johansson, Birgitta 2005:1 p.10
[204] Johansson, Birgitta 2005:1 p.17
[205] Aoki & Hamamatsu 2001 passim
[206] Aoki & Hamamatsu 2001 p.65
[207] Kaufman et al 1998 p.531
[208] Millennium Ecosystem Assessment 2005 pp.25, 64

species are extra sensitive to changes, which ought to make systems with a higher degree of biodiversity less instead of more stable and less instead of more resilient.[209]

David Tilman presents a list of investigations with very differing conclusions. Some support the idea that larger diversity means a higher degree of stability. Some point in the opposite direction, and some have found no connection. It should also be remembered that relatively few investigations have been done in this field.[210]

The Biodiversity syntheses from the Millennium Assessment Report, concludes that there is what they call "established but incomplete" evidence that a lower biodiversity means a lower resilience to, and ability to recover from, disturbances.[211] They also acknowledge that some species are much more important than others, and that the *composition* of species has turned out to be at least as important as the sheer *number* of species.[212] The latter point has also been made by Norton who none the less sees the number as the important question to concentrate on when we discuss preservation.[213]

To sum up before we slide too far away from ethics and too deep into ecology: In order to secure the ecosystem services we need working ecosystems, and in order to secure working ecosystems in the long term, we inevitably need at least some degree of biodiversity.[214] However, we cannot say for sure that the larger the biodiversity, the better for a steady delivery of ecosystem services, and we can probably not say that we need all species for this purpose. We can say with great confidence about some particular species that they are very important in this respect, while the confidence is much lower regarding other species, and there is great uncertainty concerning many species. There is also a great uncertainty concerning how many species it takes to make a certain system work.

Norton believes that the contribution of each species is in most cases very small. There are many species and the systems contain much redundancy.[215] Therefore, the probability for each particular species to be the one that causes the system to break is extremely small.[216] On top of that, many threatened species are naturally rare, which means that their contribution ought to be even lower.[217]

Norton does not believe that these problems are devastating, however. He presents three reasons for that:

1. Even though there is much redundancy in most ecosystems, this is not a reason to be less cautious. In fact, it is the redundancy that drives the competition, which in turn drives evolution. Redundancy is therefore very

[209] Aniansson 1990 pp.37f, 64, Rolston 1994 p.74, Sober 1986 p.176. See also Aoki & Hamamatsu 2001 p.70 who lists some examples. The authors are however critical to their conclusions that are based on what they label "mathematical toy models".
[210] Tilman 1996 p.350
[211] Millennium Ecosystem Assessment 2005 p.5f
[212] Millennium Ecosystem Assessment 2005 p.22
[213] Norton 1986:1 p.112
[214] McGarvin 2001 p.25, Millennium Ecosystem Assessment 2005 pp.2, 22, 28, 30
[215] Norton 1986:2 p.271
[216] Norton 1986:1 p.122
[217] Norton 1987 p.61, Rolston 1994 pp.51, 64, Sober 1986 p.176

important, and even if a species is rare, it may still be an important participant in the evolutionary process. Naturally rare species are often naturally rare because of their far-reaching specialisation. If a species is extremely specialised, the niche it inhabits is bound to be very small. A far-reaching specialisation can, however, be a strong evolutionary force in relation to other species that partly compete within the same niche, even though they are not limited to that niche. Even the extinction of rare species is therefore significant in terms of decreasing competition in relation to the characteristics for which it is specialised.

2. Our knowledge of the evolutionary process is in general not good enough to specify the importance of every species, and therefore we cannot say that a certain species is redundant.[218]

3. As we saw above, even if the disappearance of a particular species does not lead to the extinction of other species, it may well lead to a weakening of some populations. This in turn may contribute to a process that eventually pushes these species over the edge.[219] In other words: When we are dealing with extinctions, it is probably a good idea to consider that even extinctions that have very small, or even no discernible effects, may have the effect of taking us closer to the point where the ecosystem breaks down, and when we reach that point (the "threshold") an extinction that otherwise would go virtually unnoticed, can have a tremendous effect on the ecosystem and thereby on us.

I believe that Norton's answers are correct and to the point, and that they show that even though the probability that the disappearance of a particular species will be devastating is quite low, this cannot be used as an argument to disregard the species.

There is one salient problem with the argument from ecosystem services, however, viz. that many species are in fact already gone and we seem to live on and prosper. Is this not an argument that we did not need all these species after all, and that it might not be such a big catastrophe if we lose some more?[220]

To this one can answer:

A. That we do not know what we could have gained from the species had they not disappeared. We are obviously alive without them, but we may have had better lives with them, and some humans who have succumbed might have survived if some of the species that have disappeared still existed.

One might also answer:

B. That there may be a time lag so that the effects do not show until later. In the next chapter we will see several examples of this. That time lag in nature is not unusual is also confirmed by fossil records.[221]

Finally:

C. We may find an answer in the threshold that Norton mentions. We may be fine so far, but we do not know for how long we can go on like this. There

[218] See also Norton 1986:2 p.277
[219] Norton 1986:1 p.121, Norton 1987 p.62
[220] This problem is pointed out by e.g. Anderberg 1994 p.111 and Ricklefs 1997 p.597
[221] Norton 1986:2 p.272

might be a threshold somewhere, and the warning signals may come too late.[222] In the worst case, we might not even know where the threshold is – which looks like an argument to be extra careful. I will, however, come back to this problem in chapter 3 where I take a closer look at this and other uncertainties we have encountered.

Both answers (B) and (C) means that even if we have not been seriously affected by the loss of a species, future generations might be affected by the loss that we have caused. I will discuss the moral implications of this in chapter 4.

The conclusion of this section is that ecosystem services are important from an anthropocentric instrumental perspective – at least as important as any of the goods and services that different species contribute with. Some of the services are necessary for our future existence. Many of the services also seem to be irreplaceable. In order for these services to work, we need a certain – probably quite high – degree of biodiversity. We cannot say, however, how many and which species are necessary for a steady supply of ecosystem services.

[222] The concept of and problems related to threshold effects and other non-linear changes will be discussed more thoroughly in the next chapter.

3. Uncertainty

3.1. Biodiversity and uncertainty

In previous chapters we have encountered many situations where our attempts to assess the value of other species have been hampered by uncertainty. The uncertainties are found on many different levels. Our knowledge and understanding of the species as such, interactions between species, ecosystems functioning and what roles different species play, is still highly incomplete and full of uncertainties.[223] The things we do know cannot always be generalised from one ecosystem to another with sustained precision.[224] There is also much uncertainty about the long-term effects and side effects of what we do to nature, not least about the threats to the species, and the threats that the loss of species implies for other species and for the ecosystems.[225] As we have seen, the uncertainties are not in any way smaller regarding the estimates of the instrumental value that different products and services from nature has for human beings.[226] What complicates it even further is that many species have not even been discovered yet. How can we value the services or goods they may supply?[227]

We will hopefully be able remove some of the uncertainty by more thorough investigations, but to remove all the uncertainties would clearly be very expensive.[228] In fact, to get a perfect understanding of what is going on in the biological world, as well as of what will happen in the long term when we make as fundamental changes as removing species from the system, might not even be possible.[229] The old view of nature as a machine – a clockwork with mechanic precision where a particular intervention necessarily leads to a particular, foreseeable effect – is replaced by a more modern conception of nature as something dynamic and complex, uncertain and chaotic.[230] We have in other words started to realise that the way nature reacts to our treatment is not completely predictable.

Donna Maher talks about a change of science from a situation where

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[223] Angermeier 2000 p.379, Aniansson 1990 pp.38, 42, Buege 1997 p.7, Cooney 2005 pp.3f, Farber 2000 p.s492, Gamborg & Sandøe 1995 p.16, Ihse 2005 p.71, Norton 1986:2 pp.223, 271, 274, 277, Söderqvist 2005 p.78, Whiteside 2006 pp.xff. The uncertainties are particularly great regarding non-vertebrate and non-terrestrial systems and species. (Cooney 2005 p.3)

[224] O'Riordan & Jordan 1995 p.199

[225] Cooney 2005 p.3, Gamborg & Sandøe 1995 p.16, O'Riordan & Jordan 1995 p.199, Whiteside 2006 p.33

[226] Farber 2000 p.s495, Martinez-Alier 1994 p.xiii, Norton 1986:2 pp.223, 274, Paoletti & Hassall 1999 p.161

[227] Randall 1986 p.85

[228] Farber 2000 p.s496, McGarvin 2001 p.25

[229] Dupré 1993 p.3, McGarvin 2001 p.25, Whiteside 2006 p.34, Östberg 1993 p.232

[230] Beltrán 2001 p.4, Herremoës et al 2001 p.193, O'Riordan & Jordan 1995 p.200, Sörlin 1991 p.18, Whiteside 2006 pp.xff

> … prediction of system behaviour was a matter of having enough data, to a 'science of surprise', where chaos and unpredictability are endemic, with stability and predictability the exception.[231]

Sverker Sörlin makes a similar point by referring to chaos theory and catastrophe theory when he tells us that the old fashioned linear models will not help us find out at which point the decreasing ozone layer, or the greenhouse effect, etc. will take an uncontrollable catastrophic turn.[232] He does not mention loss of biodiversity, but the same reasoning can probably be used here.

One of these nonlinear phenomena that we have to consider when we are dealing with complex things like living beings or ecosystems is (as we have noted earlier), the existence of threshold values.[233] Normally we assume that cause and effect are proportional, and can be described by some linear equation, i.e. a certain change in the cause leads to a corresponding proportional change in the effect. However, in some situations all or most of the effect takes place when the causation power has reached a certain value – the threshold value. In these cases, most changes in the causation power do not have any visible effect at all, but still have the important indirect effect of taking us closer to the threshold value. This climbing closer to the threshold value is in many cases something that takes place invisibly.[234] For a long time we will not see any changes at all (or only very minute and seemingly insignificant changes) either of the object we are interested in, or in its surroundings. We will thus not even have any indication of what will happen or when. When the threshold is reached, the next change in the causing power, however small, will mean all the difference in the world. Then the up to now only latent effect will suddenly occur all at once.

In our case, it would mean that the disappearance of a single species, or two or three, from an ecosystem might not result in any discernible effects on, for example, the ecosystem services. This may go on for a while but when a threshold is reached, the results could be dramatic.

Anne and Paul Ehrlich use an analogy about a person who pops rivets from the wings of airplanes. He sells the rivets for 50 cents each and he defends himself by pointing out that:

> I've already taken 200 rivets out of this wing, and nothing has happened yet. Lots of planes fly with missing rivets. They build a lot of redundancy into jet aircraft, partly because they don't completely understand the materials and stresses involved, so nobody can prove that taking another rivet out will weaken the wing too much.[235]

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[231] Maher 1999-2000
[232] Sörlin 1991 p.255
[233] Daily 2000 p.335. Clarke 1995 p.41, Herremoës et al 2001 p.193, McGarvin 2001 p.25, Norton 1986:1 p.123, Whiteside 2006 p.33 (Clarke talks about them as "jump effects".)
[234] This is not always the case though. Sometimes it is indicated by something else than the effect we are worried about (and do not see any trace of yet).
[235] Ehrlich & Ehrlich 1990 p.95

As we saw in the previous chapter, decreasing redundancy might have unwanted consequences. One consequence that we touched upon was that we might be approaching a threshold. The story about the rivet popper illustrates this problem.

As Bryan Norton points out, the assumption of the 'rivet popper' that the absence of any accident so far is an indicator that the risk of an accident in the future is very low, would be true if we were talking about a series of independent events. The problem is that we are not. For every rivet he pops, there are fewer rivets left, which means that the constitution of the plane is constantly getting weaker. The same goes for species: For every species that goes extinct above the speciation rate, there are fewer species left, and the ecosystem – even the global system – is weakened.[236]

This is typical for threshold effects. Every change in the input takes the system closer to the threshold even though the effect is not noticeable until we reach the threshold.

Margareta Ihse extends the collection of "threshold-analogies" with an analogy about a hammock where the species are the threads of the fabric that will hold us up for a while, but bursts when the fabric gets too thin.[237] This is a very good analogy of ecosystems as well as of the circulation of nutrients, etc. in nature. They can be described as a web with many intertwined threads. This gives the system a certain amount of stability and resilience but we do not know when the web gets too thin to uphold its functions. It also illustrates that the resisting power of nature that is due to the redundancy in the systems is never a guarantee against severe changes. It holds back – and hides – the changes for a while and lulls us into a false sense of security. It does not stop the change forever though. When the threshold is reached all the accumulated change occurs at once.

The Ehrlich analogy points at an important difference between the natural disappearance of species and the high extinction rate we are facing at the moment due to anthropogenic interventions: Normally the species that go extinct are replaced by other species just like lost rivets in an airplane are replaced by new rivets.[238] At the pace by which species disappear today, the species cannot be replaced fast enough, however, and we face a net loss.

There is one important difference between the analogy with the rivets and the loss of species, however. Unfortunately, this difference also makes the loss of species much more problematic than the loss of rivets. New rivets can be taken from the storeroom and the lost ones can be replaced. Species on the other hand are replaced by evolution. Instead of being taken from a storeroom, they evolve from the genetic basis that *already exists in the existing species*. This tells us that in order to replace lost species with new species that have a better chance of survival, we need above all a large selection of genes. I.e., we need a large biodiversity, and that is precisely what we are losing.

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[236] Norton 1986:1 p.122, Norton 1987 p.68
[237] Ihse 2005 pp.70f
[238] Ehrlich & Ehrlich 1990 p.96

The non-linear aspect can be brought one step further and form another argument to consider: Sometimes a very small change in the input can have a very large effect on the output. If there are effects like this in ecosystems, it must be a very strong argument indeed for extra caution about all interventions in the ecological systems – including interventions that contribute to the extinction of species.

Furthermore, if we take a closer look at the evolutionary process, we will find that one of its inherent features is that it has no predetermined direction. It is not the case that the individuals of a species always get bigger or faster or more intelligent. The direction in which the evolution takes a certain species depends on its environment and on chance. The environment changes all the time, and what "remedy" that evolves in a certain species as an "answer" to a particular change in the environment depends on what its gene pool happens to have in store, and on which re-combinations and mutations that happen to take place. Which of these "remedies" in turn that eventually are favoured by natural selection, depends not just on one single aspect of the environment in which the species live, but on the total selective pressure that the environment puts on the species. If rabbits (Oryctolagus cuniculus) become faster, foxes (Vulpes vulpes) have to evolve too, but not just in relation to the rabbits. If they evolve a quality that makes them better rabbit hunters but also makes them less resistant to cold or easier prey for the lynx (Felis lynx), they will lose out in the evolutionary game anyway. All species are in fact at any given moment subjected to pressure of many different types from many different directions, and the sources of the pressure are also in their turn subjected to pressure of many different types and from a large number of different directions – including from the species they are exerting pressure on. If we were going to calculate the direction of evolution for the fox, we would have to consider the selection pressure that is placed on the fox by both the lynx and the rabbit, as well as all other species that interact with the fox directly or indirectly as well as all the non-living forces of nature. The rabbit and the lynx and the other species evolve too, however, and that has to be taken into account. The fox is putting both the rabbit and the lynx under selective pressure just as they do with the fox, but that is not all. The Lynx not only eat foxes but also rabbits so we have to look at the pressure they exert on each other. The Lynx eat other prey too and the rabbit is not just hunted by the fox and the lynx. It therefore does not just evolve in a way that helps the rabbits cope with the threat from these predators, but also as a result of how the golden eagle (Aquila chrysaetos) evolves since they eat rabbits too, etc. The pressure from the lynx and the golden eagle will inevitably also affect what options the genes of the rabbit have when it comes to "dealing" with the threat from the fox and so on. Then we have to put the result we get for the rabbit back into our equation for the fox together with the results from other prey species for the fox, and so on and so forth – only to find out that while we have been busy doing these calculations the whole scenario has already changed.

In short, we have a problem that is infinitely more difficult to solve than the "three body-problem" in physics.

What this tells us is that we simply cannot know for sure what will happen in an ecosystem in the long run when we make such a radical alteration as changing the species composition.

Changing the species composition can be done in different ways. It can be done, for example by causing a species to go extinct as we are discussing here, or by putting in a new species that was not there before (but that may well result in other species disappearing).[239]

The best literary description of the latter is probably Michael Crichton's book "Jurassic Park".[240] In this book, species of animals and plants that lived more than 65 million years ago are resurrected and introduced in a present day environment. As we know, it did not work out very well in spite of the guarantees from John Hammond and his bio-engineers. This was of course just fiction. We do not know what would really happen in a situation like this, but the point of the story was just that: We *do not* know, because we *cannot* know. It is impossible to predict the results from such a project, and therefore we should be more cautious. To recreate pre-historic organisms is quite extreme, but many of the interventions we make are almost as extreme, and as we saw above, our possibilities of foreseeing the results are limited. The best and most frightening illustration in the book is probably the absolute confidence by which Mr Hammond and his staff guarantee the safety of the arrangement. (What is particularly frightening is how easy it is to recognise this unshakable confidence in many people in the real world.)

Michael Crichton's description is very illustrative and very thought provoking. However, there are also many real-life examples of how we have intervened in nature and ended up very surprised over the results.[241] The rabbit population explosion in Australia and the drought catastrophe in Sahel in Africa are both described as examples of catastrophic situations caused by our ignorance about ecology.[242] A well-known example of how human beings have deliberately tried to engineer nature to suit our purpose by *taking away* a species from the system, is the wolves that were hunted virtually to oblivion in North America in order to protect both farm animals and game animals (or to be more precise, to protect human farmers and hunters from the competition). This resulted in an explosive increase in the number of deer, which in turn caused a lot of damage to the ecosystems (and to the deer population). It also had a negative economic effect on the human population since it destroyed the grazing for domesticated animals such as sheep.[243]

All the examples above confirm the problem of predicting what will happen in an ecosystem as a result of human encroachment. The lesson that seems to emerge from this section, is that we will probably never reach a situation where

[239] For a discussion of the handling of uncertainties in relation with the latter, see Cooney & Dickson 2005 p.9.
[240] Crichton 1991 passim
[241] See e.g. Whiteside 2006 p.11
[242] Palmer 1995 p.26f
[243] Ricklefs 1997 p. 598

we have enough information to make a fully informed decision as to which course of action is the most rational from an anthropocentric instrumental point of view. The uncertainties are sometimes used as an argument against conservation, and sometimes as an argument in favour of conservation.[244] What we need is a strategy that can tell us what the most rational behaviour is from an anthropocentric instrumental viewpoint, given these uncertainties. In the coming sections we will try to find such a strategy, and we will in particular take a closer look at the so called *precautionary principle* that has been much discussed recently.

3.2. Dealing with uncertainty

There is, as we noted in the previous section (and have seen many examples of in the previous chapter) much uncertainty surrounding the things we have to consider in order to answer our main question. We also noted that it might not even be possible to totally get rid of all the uncertainty, or even to reduce it to a reasonable level. We therefore need a strategy for how to behave in situations of uncertainty. Åsa Mattsson identifies four different strategies:[245]

I. One strategy is not to change anything until we have a better understanding. At first sight, this looks like the only rational strategy: If we lack sufficient knowledge to make a good decision, it must be better not to make any decision at all – at least until we have sufficient knowledge.

It has also been suggested that lack of knowledge as such cannot be an argument in favour of acting in a certain way. [246] If that is correct, it is a strong argument for this approach. It would also be very important for our investigation. Lack of knowledge regarding the future value of a species is sometimes used as an argument for preservation.[247] That argument would be refuted if we find that lack of knowledge cannot be an argument for any particular strategy – including preservation.[248] There are problems with this strategy, however. The most important problem is probably that deciding to wait for better knowledge is *also a decision*, and waiting must mean something. In bi-polar decisions like preserving or not preserving, a decision to wait must still mean that we either preserve or not preserve while we wait. Waiting can for purely logical reasons not mean that we abstain from both until we have better knowledge. The question is therefore: Does waiting mean that we preserve the species until we know more or does it mean that we exploit the species until we know more?

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[244] Gärdenfors 2005 p.119, Norton 1986:2 p.274
[245] Mattsson 2006 pp.10f
[246] Sober 1986 pp.175f
[247] See previous chapter. See also Gärdenfors 2005 p.119
[248] Sober 1986 pp.175f

The answer to the question "what do we do while we wait" is often very important. In situations where we deal with irreversible changes it is extremely important. That the "wait and see" strategy does not have an answer to this question (it cannot have one – that is the very point of the strategy) is very problematic. What is even more problematic is that this strategy, most of the time, in practice means that ongoing trends are allowed to continue while we wait for better information. Postponing the decision is thus in reality often the same as a decision to continue the ongoing practice.[249]

Another problem with this strategy is that it is, as we saw in the previous section, possible that we will *never* reach an understanding that is much better than the one we have. This means that we will not gain anything by waiting.

Finally, we have to be aware that there is a risk involved in waiting. In cases where it is possible to get more information, it is in general true that waiting for this information before we make the decision increases the probability that the decision will be better *when it comes*. On the other hand, there is a risk that it will then be *too late*. This can, in some situations, make waiting a very dangerous strategy – in particular when what is at stake is irreversible and/or irreplaceable.

II. A slightly different strategy is to wait for a better understanding, but at the same time monitor what is happening while we wait and prepare for the possibility of problems materialising along the way. This strategy has the same advantages and drawbacks as the previous one, with the difference that we are better prepared to deal with problems as they appear. This does not seem like a good solution when dealing with nonlinear and irreversible changes though since we will not be able to act until the problem has already appeared and then it will be too late.

III. Another strategy is to act immediately on the best available information, and hope it is correct. By doing that we will not lose any time, but we run the risk that the information turns out to be incorrect. There is also the drawback that since we are treating our inadequate information as adequate, we leave no room for precautionary measures in case it turns out to be wrong.

IV. Finally, we have the strategy of making a decision based on the information we have but adapting it to the uncertainties, and building in some precautionary measures in case events turn out differently than predicted.

There are different versions of this strategy but the version that has received the most attention recently is the so-called *precautionary principle*. This strategy is recommended or even prescribed by many official sources. These include international declarations and treaties such as the Rio declaration, Agenda 21, the constitution of the European Union and many others, and also national as well as regional and local legislation in many countries.[250] If we can show that the

[249] Rolston 1988 p.280

[250] See Herremoës et al 2001 p.14, Raffernsperger 1999, and http://www.institute.redlands.edu/p3/tthome.htm for lists of treaties containing references to the precautionary principle. See also Beltrán 2001 p.3, Case 2005, Commonwealth Consolidated Acts Environment Protection and Biodiversity Conservation Act 1999 - Sect 391, Cooney & Dickson 2005

precautionary principle is ethically and rationally in accordance with anthropocentric instrumentalism, or even required by anthropocentric instrumentalism, and if we can show that it would require that we avoid causing species extinction, then we will have a good answer based on anthropocentric instrumentalism to why it is morally reprehensible to cause extinction.

In the next section, I will try to produce an interpretation of the precautionary principle that is in accordance with basic moral intuitions. In the section after that, I will go on and take a look at some proposed problems with the principle. Finally, I will try to apply it to the species problem and see first of all whether it is possible, and in that case, what the result would be.

3.3. The Precautionary Principle

The precautionary principle has been formulated in several different ways. The most common formulation is from the Rio Declaration: [251]

> Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.[252]

The Rio declaration in general leaves much room for interpretation, and the precautionary principle is no exception.[253] There is a large flora of interpretations, and there is still no real consensus.[254] The Rio formulation has also been criticised for being too weak, and for not really telling us what to do, but only what *not* to do (i.e. *not* to use lack of scientific certainty as an excuse for not acting).[255] Nonetheless, it can be used as a good starting point for our investigation. It seems that the basic idea expressed by this formulation is that "business as usual" is at least in some situations – viz. in situations where we risk

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pp.10f, Environmental commons, Gollier & Treich 2003 p.81, Grandjean 2004 p.206, Grandjean et al 2004 p.482, Lin 2001 p.129, Melin 2001 p.98, O'Riordan & Jordan 1995 pp.192ff, 197f, Rio Declaration §15, Sandin 2004:2 pp.2f, Sandin 2004:3 p.8, San Francisco Adopts the Precautionary Principle, SF Precautionary Principle Ordinance, Turner & Hartzell 2004 p.450, Walsh 2004 p.69. Whiteside 2006 pp.viii, 76f, 114f, 146, 149

[251] See e.g. Barrett 2005, Case 2005, Cooney 2005 pp.5f, Cussio 2005, Gee 2006, Gollier & Treich 2003 p.81 Grandjean 2004 p.206, Lin 2001 p.129, Melin 2001 p.101, Stijkel & Reijnders 1999 pp.304f, Sandin 1999 pp.895, 903, Sandin et al 2002 p.289, Sandin 2004:1 p.4, Sandin 2004:2 p.5, Walsh 2004 p.69, Whiteside 2006 pp.VII, 79, 119

[252] Rio Declaration §15

[253] For a discussion of the Rio formulation, see Sandin 1999 p.895, Sandin et al 2002 p.289, Sandin 2004:2 p.15, Sandin 2004:3 pp.10f

[254] Cooney & Dickson 2005:1 p.8, Sandin 1999 p.889, Sandin 2004:2 p.2

[255] Sandin 2004:1 p.4

serious or irreversible environmental degradation – not the best response to uncertainty.

There are other competing formulations and they too are intensely debated.[256] One formulation that is often referred to is the so-called Wingspread formulation.[257] It was formulated six years after the Rio formulation at a conference with a number of scientists, activists, etc. from different countries (though mostly from North America). It states the principle as follows:

> When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.[258]

Contrary to the Rio formulation, the Wingspread formulation is stated as a positive prescription. It is also somewhat more specific than the Rio formulation regarding what counts as scientific certainty. Finally, it widens the scope of the principle by being more general regarding the kinds of threat, and also by including human health among the relevant considerations for application. It seems clear, though, that the two formulations are built upon the same basic intuitions.

Other formulations point clearly in the same direction.[259] Grandjean et al interpret the Precautionary principle as:

> … a tool for avoiding possible future harm associated with suspected, but not conclusive, environmental risks.[260]

Per Sandin defines the basic idea of the precautionary principle as follows:

> … on some occasions, measures against a possible hazard should be taken even if the available evidence does not suffice to treat the existence of that hazard as a scientifically established fact.[261]

According to Whiteside:

> … the precautionary idea in risk regulation is at work whenever authorities take early preventive measures to forestall a potential, irreversible danger, even though causal links in the chain leading to that danger have not yet been firmly scientifically established.[262]

Timothy O'Riordan and Andrew Jordan state:

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[256] Cooney & Dickson 2005:1 p.8
[257] Grandjean 2004 p.206, Sandin 1999 pp.891, 905, Sandin 2004:1 p.4, Sandin 2004:3 p.8, Turner & Hartzell 2004 pp.449, 251f, passim, Whiteside 2006 p.149
[258] Wingspread Conference 1998
[259] See e.g. Gollier & Treich 2003 p.77
[260] Grandjean et al 2004 p.282
[261] Sandin 2004:2 p.3 This interpretation is stated more or less similarly at other places, e.g. in Sandin et al 2002 p.288, and in Sandin 2004:3 p.2
[262] Whiteside 2006 p.65

> At the core of the precautionary principle is the intuitively simple idea that decision makers should act in advance of scientific certainty to protect the environment (and with it the well-being interests of future generations) from incurring harm.[263]

These are some examples of how different authors have tried to identify the core of the precautionary principle. The formulations differ, but the basic theme is the same: If we suspect that something is a threat to some important values – in particular to human health or the environment – we should do something about it even when we are not totally sure that it is a threat.[264]

I think it might be a good idea to get some understanding of the intuitions behind the principle in order to gain a better understanding of how to use it. It is also important for our investigation to find out whether the precautionary principle is justifiable from the position of anthropocentric instrumentalism. The formulations we have seen so far seem to be consonant with a number of basic moral intuitions that would justify the precautionary principle, and help us specify what it means and how it should be applied. I will take a closer look at some of these intuitions.

3.3.1. Promoting the positive versus avoiding the negative

It might be argued as a basis for the precautionary principle, that it is more important to avoid things that are negative than to promote things that are positive.[265] This intuition could explain expressions like "err on the side of caution", and "better safe than sorry". It seems that the precautionary principle could be interpreted along these lines,[266] but is it a reasonable position to hold?

Kuntz-Duriseti reasons from an economic perspective and claims that the damage from a negative economic shock is larger than the value of a positive economic "shock" of the same size.[267] Ingar Brinck on the other hand attempts to give an evolutionary account of the intuition. She believes that it has been more important for our survival to concentrate on negative events than on positive events.[268]

Kuntz-Duriseti does not provide any argument for his claim other than his intuitions, but let us take a closer look at Brinck's idea: If we are in a situation where we can make a decision we are obviously alive and we have at least some

[263] O'Riordan & Jordan 1995 p.194
[264] Cooney 2005 pp.5f draws approximately the same conclusion.
[265] Holtug 2002, Munthe 1997
[266] see e.g. Munthe 1997
[267] Kuntz-Duriseti 2004 pp.293, 296
[268] Brinck 2005 p.53

degree of influence over our own lives. In such cases, it might be correct that we from a "survival perspective" are in a situation where we have more to lose than to gain. On the other hand, in order to improve our evolutionary fitness, there seems to be quite a lot more to desire. In order to propagate our genes, and thereby the inclination to be more negative towards harm than positive towards improvements, we need to mate, something we might have to be risk-taking in order to be successful at. In the evolutionary game, risk-taking individuals often lose, but when they win, the return is high. Therefore, it is not always an evolutionary advantage to be more negative towards harm than positive towards improvements – just as it is not always an advantage to be more negative towards harm than positive towards improvements. It seems that from an evolutionary perspective there is probably room for both attitudes in a population (a mix of "strategies").

Either way, an evolutionary explanation cannot on its own tell us whether the intuition is *morally justified*.

One problem we have to face is that it is not totally clear what it means to say that it is more important to avoid negative values than to promote positive values. In one interpretation, going from where we are to a *worse* position is a less acceptable option than *not* going (the same distance) from where we are to a *better* position – other things being equal but independent of where we are on the positive-negative scale. If we, for example, talk in terms of happiness, this interpretation would mean that it is always worse to make someone less happy than to abstain from making someone more happy to the same degree no matter how happy they are to begin with. If we have to choose between an option (A) that will prevent a decrease in the level of happiness for someone who is already in a bliss by 5 "units", and an option (B) that will increase the level of happiness for someone in great misery also by 5 "units", we are obliged to chose (A). This looks quite counter intuitive.

Another, and stronger, interpretation says that *all* changes for the worse are more important than *any* change for the better. If we use the happiness example above and adapt it to this interpretation it would tell us that in a choice between an option (C) that will prevent a small decrease in happiness for someone who is really happy (with say 1 "unit"), and an option (D) that would largely increase the happiness of someone who is really miserable (with say 100 "units"), we are obliged to chose (C). This also looks quite counterintuitive.

Neither is it clear how to distinguish harm from lack of improvement. When we talk about harm versus improvement we have to ask "in relation to what?" Are we talking about a harm/improvement in relation to the situation which the affected person is in, or are we talking about harm/improvement in relation to some fixed baseline, and how, in that case should the baseline be fixed?[269] There are also other complications: If we fail to prevent a pain, would that be an example of a harm or of a lack of improvement? The situation is getting worse than it is now and could therefore be seen as a harm. On the other hand, it is a

[269] Holtug 2002 pp.268f

matter of something that would have been in a better state if we had intervened, which sounds like something we have failed to improve.[270] We can even question whether an intervention that increases someone's pleasure is just a matter of improvement or if it is also a matter of preventing a lack of enjoyment that she would otherwise suffer – i.e. of preventing a harm.[271] Apparently, it makes a great difference if we consider a state of the world or if we consider an ongoing process.

Another problem is that it is not quite clear what it means to say that avoiding negative values are more *important* than promoting positive values. Important in what sense? Are we talking of the same scale when we talk of the importance as when we talk about the positive and negative values in the phrase we are investigating? It might be that we have a meta-scale according to which moves on the lower scale get different values depending on which way they move or where they are on the scale. An alternative interpretation would be that the question about whether negative values are more important than positive values is a *moral* question, while the values we are comparing (the positive and the negative values) are about *personal experiences*. Such a move is not easy to justify. Why should negative experiences carry a larger weight than positive experiences of the same size from a moral perspective? We need independent justification in order to make such a controversial statement.

The intuition saying that it is more important to avoid negative values than to promote positive values may well be an important *explanation* for the popularity of the precautionary principle. However, because it is so controversial, and because it is in itself in need of justification, I will abstain from using it as a *justification* or as an *interpretation* of the precautionary principle.

3.3.2. Irreversibility

One common intuition that might help us justify and understand the precautionary principle, is that some outcomes are considered unacceptable and should therefore never be risked no matter what we could gain by risking them – or at least we need extraordinary security against them.[272] In this section, I will discuss this intuition, and I will concentrate on one particular outcome that is often mentioned as being of this particular kind – viz. irreversibility.[273] It is even explicitly incorporated in some official formulations of the precautionary

[270] Holtug 2002 pp.268f
[271] Holtug 2002 p.370
[272] Munthe 1997, O'Riordan & Jordan 1995 p.194
[273] See e.g. Attfield 1998 p.219, Herremoës et al 2001 p.13, O'Riordan & Jordan 1995 p.193, Rio Declaration §15, Rolston 1988 pp.267, 309, 320, Whiteside 2006 p.33, World Commission on Environment and Development 1987 p.20

principle as one of the things we should take precautionary action against.[274] Since extinction, as we have seen earlier, probably is irreversible, it would also have immediate relevance for our investigation.

When Per Sandin discusses irreversibility as an aspect of precaution, he follows Fleming in viewing it as one of three aspects of 'threat' that are relevant for our understanding of the precautionary principle. The three aspects are: Severity, irreversibility and preventability.[275] If the threat is not preventable, it is meaningless to take precautionary measures even if it is irreversible (it would not even be possible to identify any measures as precautionary). That severity is relevant seems intuitively plausible as well. The more severe an outcome is, the more important it must be to take precautionary measures against it. It is also intuitively plausible that a certain degree of severity is a necessary prerequisite for invoking the precautionary principle. An event that is irreversible but not negative hardly calls for precaution, and an event that is only slightly negative but can quite easily be counterbalanced by the positive effects you get from the process in question (or from abolishing a process), should reasonably be treated as one value among others and be dealt with in a normal cost/benefit-analysis. Sandin illustrates the importance of severity by an example of a boulder that is crushed in order to get gravel.[276] This is clearly an irreversible act, but it is not very severe (or in general bad).

In fact, irreversibility might even on some occasions be a good thing. If we manage to get permanently rid of some great evil, that is surely positive.

It thus seems that irreversibility cannot be a sufficient reason for invoking an extra precautious decision procedure. It has to occur in combination with preventability and some degree of severity. Perhaps it is not that simple though. Can irreversibility not be considered as something that is negative in its own right, and thereby automatically fulfils the severity criterion just by being irreversible? Obviously, irreversibility can have a negative intrinsic value for some people, but probably not a great enough negative intrinsic value to fulfil the severity criteria in its own right.

Another alternative is that something else has a very high intrinsic value, and that irreversible changes by necessity destroy this value. That way, irreversibility would not have a negative intrinsic value, but by being inherently destructive in relation to something that has a positive intrinsic value, the effect would be very similar in that irreversibility would be necessarily instrumentally negative. I can imagine two widely held values in relation to which irreversibility is necessarily negative, namely choice value and democracy. The reason why irreversibility is necessarily negative in relation to these two values is the same in both cases: An inherent feature of irreversibility is that it limits our future range of choices. This means that irreversibility always has a negative choice value. This in turn means that we take decisions on behalf of all future generations – decisions that they will never be able to change. Therefore, it is a democratic

[274] Most notably the Rio formulation (see above). See also Herremoës et al 2001 p.13
[275] Sandin 1999 p.892
[276] Sandin 1999 p.892

problem as well. In relation to both these values – choice value and democracy – irreversibility seems to be necessarily negative. This means that if we value freedom of choice or democracy, the fact that a certain decision is irreversible, is by necessity an argument against it.

Is this a sufficient reason for removing irreversible decisions from the realm of acceptable choices or at least to grant it extra ordinary treatment? I do not believe it is. Choice value and democracy are two of many values that might be affected by, and therefore should be considered in a decision. Even if they are important values, we may assume that they can be overridden by other values. It does not justify that we give irreversibility any extraordinary standing in the decision process. That something is a problem *by necessity* does not tell us anything about how *severe* the problem is. The problems we have discussed do not seem to be severe enough to grant irreversible changes the special status we are looking for.

I do not believe we need to claim that irreversibility is a sufficient prerequisite for inferring the precautionary principle, however. When we are dealing with a problem that is severe in its own right or for some independent reason, *and* it turns out to be irreversible as well, the irreversibility can be a factor that enhances the problem to such a degree that it gives the problem a special status. Clearly, a decision that might lead to a severe problem, *and* that is also irreversible, must be treated with extra care. This could be handled by demanding that the burden of proof (in the form of showing that the suspicions are unfounded) should rest on those in favour of the irreversible alternative.

For instance, in a situation where we suspect that a certain resource might become very important in the future, it seems reasonable that we should be extra careful not to irreversibly destroy it even if we lack strong evidence about its future importance. It even looks reasonable to say that if we suspect that something will be more important in the future than the gain we will get from destroying or depleting it today, then we need extra strong proof against this suspicion if the destruction or depletion would be irreversible. This means that apart from being a problem due to its special relation to choice value and democracy, irreversibility is also a problem when combined with something that may turn out to be problematic for some other reason. This brings us back to the discussion about the boulder: Smashing the boulder would be an irreversible act. Therefore, if we suspect that the boulder might turn out to be more important in the future than the gravel is today and in the future, then we must not destroy the boulder unless we have very good arguments against this suspicion. Generally, if we suspect that something would be of higher value in the future if it remains unchanged compared to the goods or services we get now and in the future from changing it, then we should not change it in an irreversible way unless we have very good arguments against this suspicion. If we go for the reversible alternative instead of the irreversible, we have an option to choose the irreversible alternative later if further investigations show that it is safe.[277]

[277] Gollier & Treich 2003 pp.83, 88

Irreversibility can therefore in many cases of uncertainty, for instance about the future value of different resources, justify a change in where we place the burden of proof.

Irreversibility does not just have a tendency to complicate decisions about resources. It seems to have effects that go even deeper. Per Sandin compares the precautionary principle with a decision principle used by insurance companies: When making business decisions, the insurance companies try to "…maximize expected monetary value, but only if bankruptcy is not one of the possible outcomes."[278]

This seems like a sensible decision principle: Use cost/benefit-analyses but make no decisions that if they fail will result in bankruptcy.

The question is: What makes bankruptcy so special? Irreversibility probably plays a substantial part: It is bad if we lose money on a deal, but we can come back and make money on another deal. It is also a pity if we stay out of a deal that would have rendered us a great profit, but we can, in general, make money on another deal (even though we have lost some opportunity value). If we go bankrupt on the other hand, it is over.[279] It is true that ordinary business opportunities may also be irreversible in a weak sense meaning that this particular opportunity will never come back. A bankruptcy seems to be irreversible in a stronger sense, however, since it means that the company can never do business again at all. I believe that what makes the stronger version stronger is that the change is not just irreversible but the thing that is irreversibly changed is also irreplaceable in relation to some important intrinsic value. A bankruptcy is treated as a change of this second type by the representatives of the company because from "the point of view of the company", the company is irreplaceable. From the point of view of certain individual employees or of other members of the society this is not necessarily the case, but as an analysis of the company policy I believe the irreplaceability aspect plays the role we are looking for. Ordinary cost-benefit analysis may well be the most rational decision method when we talk about "ordinary" events such as recurring economic deals. In these cases, expected value is probably a good account of the long-term gain or loss, and extremes that happen quite seldom are in general outweighed in the long term by the sum of the smaller but more common events. On the other hand, if we are talking about bankruptcy or about the irreversible loss of irreplaceable life-supporting systems (the "ultimate bankruptcy"), the situation is extra tricky in that this particular type of effect cannot be allowed to happen *even once*. In situations like these, it seems rational to adopt an alternative strategy for decision-making.

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[278] Sandin 2004:2 p.8

[279] There is of course an important difference: A bankruptcy is obviously not irreversible in the same way as is loss of irreplaceable life support systems. A company can go bankrupt but the people involved can live on and eventually start a new business – which might explain why some aggressive actors on the market are, after all, prepared to risk bankruptcy to get a chance at the really big harvest. It illustrates the main idea nevertheless.

The conclusion has to be, that apart from being inherently bad in relation to choice value and democracy, irreversibility also has the property of making bad things worse in a way that is particularly significant for both the general understanding of the precautionary principle and for our investigation. This goes especially (but not exclusively) when the thing or system in question is irreplaceable. That is: For situations that cannot even be allowed to occur once.

Is irreversibility then a *necessary* prerequisite for applying the precautionary principle? The Rio formulation can be interpreted that way, but is it a reasonable interpretation of the principle? Suppose we substitute the smashed boulder in Sandin's example with a species that is pushed to extinction. Let us also add the assumption that we could recreate it exactly as it was (and at the same time make the highly unrealistic assumptions that the problems about reintroduction pointed out earlier – e.g. that the environment in which it lived has not changed, etc. – can been avoided). Let us also assume that the loss of the species has some very bad effects.

The intuitions part ways here. On the one hand, irreversibility does seem to be relevant. On the other hand, if a certain state of the world is bad, then it is bad even if it is just temporary. If we are dealing with a species that is instrumentally important for us, is the state of the world not then worse for us during the time the species is gone even if we know that we can get it back? We would in any case lose what the economists call opportunity value, that is to say, opportunities for utilisation of the species. Some people with a disease that could have been cured by a medical drug from the species would die. This is bad even though we will be able to cure future people once we have revived the species.

Imagine that we exterminate a species that could, but will not, be revived. It seems to me that this cannot be accepted at the same time as we maintain that the effects of an *irreversible* extermination are unacceptable. I therefore believe that it would be unreasonable to consider irreversibility as a necessary prerequisite.

The conclusion is that irreversibility is not sufficient and not necessary for the precautionary principle to be justified. It does, however, provide a very strong justification for the precautionary principle, and it also tells us some things about how the principle should be interpreted: When we deal with a decision that is suspected to lead to severe problems and to be irreversible, then we need extra strong evidence against these suspicions. If we are dealing with a decision that might lead to the loss of a thing or a system/process/etc. that is irreplaceable in relation to the protection or promotion of an important value, the burden of proof must be extra heavy on those in favour of the decision.

Since both severity and suspicion come in degrees, the evidence we need against the suspicion should also come in degrees, depending both on how strong our suspicion is and on the severity of the problem.[280]

[280] Gee 2006 and Grandjean 2004 p.208 reason along the same lines even though they do not discuss irreversibility in particular but severity in general.

3.3.3. The value of human health

It is sometimes claimed that values like human health and the environment tend to be downplayed in traditional decision procedures.[281] Threats against human health or the environment are also explicitly stated in many formulations of, and discussions around, the precautionary principle, as cases where it should come into play.[282]

This indicates that one of the intuitions behind the principle is that human health and the environment need to be better protected than has been the case in traditional decision procedures.

If this is correct, it means that the precautionary principle indicates a change of value. Not just like in 3.3.1, a change in how we weigh positive and negative value, but a change in what we find most important.

Since this part of the investigation is a search for duties to protect species as a result of purely anthropocentric instrumental values, and I do not want to beg the question by building on an assumption that the environment ought to be protected, I will here concentrate on the idea that human health ought to be better protected as a basic value behind the precautionary principle.

That human health should be highly valued from an anthropocentric vantage point seems obvious, but it is not obvious how it should be valued in relation to other human values. In cases were human health competes with other values some kind of trade-off must be done. Maybe one motive behind the precautionary principle is to be found in the way the trade-off between human health and other human values is normally done. It seems that the value people place on human life and human health is ascending, and it may therefore be a general intuition that when economists and decision makers make comparisons between human health and other human values (whether these comparisons are expressed in monetary terms or not), human health is assigned a value that is too low. Some authors believe that problems in connection with the trade-off between different values including human health, are a major motive behind the precautionary principle,[283] maybe even more important than uncertainty.[284]

The question that immediately arises is whether this change in value cannot be dealt with in a simpler way by just assigning a higher value to human health in an ordinary cost-benefit analysis. The answer is that the problem might be inherent in the model. The entire decision procedure seems to be biased to the disadvantage of values like human health.

In order to be fitted into the decision model, the value of human health has to be translated into monetary value. How this should be done is far from clear, however. Values like this are notoriously difficult to express in monetary terms. Some even claim that it is genuinely impossible. Even so, it is frequently done,

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[281] See e.g. Turner & Hartzell 2004 p.453, Lin 2001 p.129, Wingspread Conference 1998

[282] Cooney & Dickson 2005 p.9, Gollier & Treich 2003 p.81, passim, O'Riordan & Jordan 1995 pp.194, 198, Sandin 1999 pp.889, 892, Sandin 2004:1 p.1, Turner & Hartzell 2004 p.449, Wandall 2004 p.270

[283] O'Riordan & Jordan 1995 p.192

[284] Cooney & Dickson 2005 p.9

though the usefulness of the result is debated. If it is not really possible to totally account for the value of human health in monetary terms, then cost-benefit analyses will be systematically misleading in cases were human health is one of the affected values.

The uncertainty whether values like human health can be totally accounted for in terms that are useful in cost-benefit analyses can be used as an argument to give these kinds of values the benefit of the doubt.

There is also another problem: Traditionally, the burden of proof has been placed on those who want to decide against an enterprise that is, or has a good chance of being, economically profitable. It seems to be consciously or unconsciously assumed that economic gain is the default reason for acting or not acting in a certain way and very good reasons are needed for those who want to change or abolish a money generating practice.[285] A particular preference order is in other words built into the process reflecting how we distribute the burden of proof. One important intuition behind the precautionary principle seems to be that this needs to be changed.

Both this and the previous problem point in the direction of changing the burden of proof. This solution is, in fact, suggested quite often when environmental or health aspects are discussed, and it is very common to interpret the precautionary principle as consisting of, or at least implying, a change of the burden of proof.[286] In the last sub-section we saw one precautionary reason (the risk of irreversible outcomes) for changing the burden of proof. A change in our priorities might be another such reason.

It seems reasonable that the question of where we place the burden of proof does – and should – reflect how we prioritise between the alternatives we are deliberating about. It therefore also seems reasonable that the question of where we place the burden should be openly discussed, and should not be seen as something that is fixed once and for all. This applies especially since the default alternative is probably not the result of a thorough deliberation. The normal decision procedures in the form of cost/benefit-analyses are performed in terms of maximising economic value. It is therefore not surprising that when economic value is to be compared to other values, the economic value is still the default value, and the burden of proof is placed on the competing value. However, this only tells us how things have happened to evolve. It does not tell us that this distribution of the burden of proof is the one that best reflects our preferences. In order to accomplish such a distribution we have to be able to question the default distribution.

The precautionary principle in the form of assigning the burden of proof in such a way that it tends to minimise the risks for human health, may thus be justified by the intuition that when human health is at stake, that should be the

[285] Herremoës et al 2001 p.180, McGarvin 2001 p.25

[286] See e.g. Angermeier 2000 p.378, Grandjean et al 2004 p282, Kuntz-Duriseti 2004 p.291, Lin 2001 p.131, McGarvin 2001 p.23 note 3, Munthe 1997, O'Riordan & Jordan 1995 pp. 183, 195f, 197f, 200, O'Riordan & Jordan 1995 pp.195f Rolston 1988 p.309, 319, Turner & Hartzell 2004 p.453, Wandall 2004 p.270, Wingspread Conference 1998. See also the section on irreversibility above.

default value instead of economic profit. That in turn means that we can interpret the precautionary principle as telling us that when we suspect that a decision might be detrimental to human health, the advocate of this suggestion should be assigned the burden to disprove this suspicion. In the same way as in the previous sub-section, it also seems reasonable to say that the burden of proof should be heavier the stronger the suspicion, and the more detrimental the decision is suspected to be.

3.3.4. The cost of being late

The traditional formulations of the precautionary principle, like the Rio formulation and the Wingspread formulation, talk about the importance of not waiting for conclusive evidence before taking measures, and they mention the importance of considering the value of what we might lose if we do not take measures. This looks reasonable but is not sufficient to form a justification. That it is important to consider the values at stake can just as well be an argument for taking the extra time needed to make sure that an intervention does not worsen the situation. In order to get to the conclusion they promote, we need an additional argument stressing the importance of *timing* when it comes to securing the values in question.

We have seen that traditionally a useful or economically profitable substance or process can only be banned or regulated on behalf of other values like human health, if we have very strong evidence of the risks presented by the substance or process. Gathering the necessary evidence may take some time, however and much can happen during this time.[287] The situation can grow much worse, and irreversible damage may occur.[288] In recent history, both people and the environment have often suffered (and in many cases still suffer) unnecessary harm because the decision makers have waited for more conclusive evidence before dealing with the problem. The EEA report on the precautionary principle *Late lessons from early warnings* describes several such cases in detail, and the content as well as the title of the report states very clearly that the editors consider the cost of time loss to be a very important motivation for the precautionary principle.[289] The ozone depleting CFC is one example. If we had not waited so long for conclusive proof that CFC destroys the ozone layer, we could have banned it earlier and avoided some of its long-term effects.[290]

[287] Gee 2006, Herremoës et al 2001 passim, McGarvin 2001 p.20, Sandin 1999 p.906 note 10
[288] Whiteside 2006 p.34
[289] Herremoës et al 2001 p.1
[290] Gee 2006

Benzene, asbestos, and lead additives in petrol are some other well-known examples,[291] and there are probably many more.[292]

The time factor is especially important when dealing with complex things like ecosystems or the human body. The effects often do not show until the substance or process has been in use for a while (for instance because of the threshold effects we discussed earlier).[293] This means that we will in general not have conclusive evidence that a substance is dangerous until it is already in the system (maybe in large quantities) and we may have to live with the problem for a long time. When we deal with nonlinear relations, it is also very difficult to establish a clear cause-effect relationship, and we may have to wait even longer than normal for conclusive evidence.[294]

The idea that we under certain circumstances should not wait for conclusive evidence before taking action seems to be a very rational decision rule. All "real world" decision-makers worthy of the epithet, from stock traders to military commanders, know that even though it is important to have accurate information, it is at least as important to act in time. As a result of what we have seen in this sub-section, it also seems reasonable to conclude that taking action before we have conclusive evidence is in some cases not only acceptable, but *required* by anthropocentric instrumentalism (as it would be by any moral theory).

This rule is also, as we saw in the beginning of this section, very central in all formulations of the precautionary principle. The problems connected with time loss is thus probably an important justification for the precautionary principle – maybe the most important.

Maybe the tendency to give an unreasonably high priority to accurateness over acting in time, has been uncritically adopted from the realm of science and philosophy? In our "world", the search for knowledge and understanding is the ultimate goal. In society in general, there are many other goals and the relative cost of losing time in relation to being wrong is sometimes much higher. Decision makers in society need information, and the best way of getting reliable information is to turn to those who have the formation of knowledge and understanding as their ultimate goal. However, since the goal of the decision makers is not precisely the same as the goal of those who provide them with information, we need a transformation rule. I believe it is very important that this is not done by changing *the rules or the aims of science*. Instead, we need an adaptor between the two realms – the realm of science and the realm of practical decision-making. It seems that the precautionary principle could be such an adaptor.

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[291] Beltrán 2001 p.3, Gee 2006, Gee & Greenberg 2001 p.59, Grandjean et al 2004 p.283, Infante 2001 pp.41f

[292] For more examples, see Cooney 2005 p.4, Grandjean et al 2004 pp.282f, Herremoës et al 2001 p.173, 176, Ibarreta & Swan 2001 p.86, Koppe & Keys 2001 pp.64f, 71, von Krauss, Martin Krayer & Herremoës 2001 passim, Lambert 2001 pp.32, 34

[293] Farman 2001 pp.76f, Gee & Greenberg 2001 p.55, Gollier & Treich 2003 p.79, Ibarreta & Swan 2001 p.87, von Keauss & Herremoës p.117, Rolston 1988 p.275, 280

[294] Whiteside 2006 p.34

Timing is not just *important* or *not important*, but more often *more or less important*. I therefore suggest that we use a gradual scale just as we have done in the previous two sub-sections. When we make a decision where timing is essential and important values are at stake, we have to move our priorities further towards the "being-in-time" end of the "being-in-time/being-right" scale. The stronger the suspicion that timing is essential and the more essential we suspect it to be, the closer we ought to move towards the "being-in-time" end of the scale.

The opposite is also true. The stronger the suspicion that correct information is essential and the more essential we suspect it to be, the closer we ought to be to the "being-right" end of the scale. Where the cut off point lies, i.e. when it is, to put it crudely, time to "stop thinking and start acting", will then have to be decided in each particular case based on the relative importance of these two factors – timing and accuracy of information – for the value at stake.

Since there have been quite a few cases where a lot of damage has been caused because regulators have waited too long before taking action, extra attention probably has to be given to the timing aspect for pure pedagogic reasons – in order to increase the awareness that timing *does* play an important role.

3.3.5. False positives versus false negatives

Scientists do not like to be wrong. In the scientific world, being wrong is, in general, worse than not being right. This does not only mean that scientists prefer to postpone their judgement until they have more evidence. It also means that they are biased to err in favour of false negatives over false positives. It is worse for a scientist's career to be exposed as having claimed something that turns out not to be the case (a false positive), than to be exposed as having denied something that turns out to be the case (a false negative). [295]

Birgitte Wandall calls the bias towards false negatives the "conservative burden of proof", since it confers the burden of proof on those who make a positive claim.[296] She also points out that the reason for this tendency is probably that one of the main values guiding science is to keep the scientific corpus (the body of statements accepted by science) as free as possible from false statements.[297] This is the scientific community's own version of "erring on the side of caution", and it is doubtlessly a good reason to trust science: If something is claimed by the scientific community to be true, it probably is true. This also means, however, that if the scientific community does not want to exclaim

[295] Gee 2006, Gee & Greenberg 2001 p.60, Grandjean 2004 p.217, 384, Herremoës et al 2001 p.184, Mattsson 2005 p.9, Wandall 2004 p.267 note 6
[296] Wandall 2004 pp.267, 269, Wandall 2005
[297] Wandall 2004 pp.267, 269

something as true, it does not necessarily mean that it is false. To believe that it does seems to be an all too common mistake that in some situations can cause a good deal of harm.[298] It is, after all, not obvious that the goal of avoiding false positives is always a super ordinate goal in society at large. In many cases where other values are at stake (values, like human health, that may not be basic epistemic values but are important values in anthropocentric instrumentalism as well as other moral theories), false negatives can have at least as severe effects as false positives. The effects of *not* regulating or banning something that is dangerous can be at least as bad from a moral point of view as the effects of regulating or banning something that is harmless. If we accept the intuition from sub-section 3.3.3 that human health needs to be assigned a higher value than has traditionally been the case, it is probably in many cases more important to avoid false negatives than to avoid false positives.[299] We therefore have a case that is parallel to the intuition discussed above regarding the value of acting in time. The conclusion must also be the same: We need a decision rule that can compensate for the difference in goals between science and practical decision making,[300] and the precautionary principle seems to be precisely cut out for that job. The cost of false negatives for a host of human values, including human health, seems just like the cost of time loss, to be a strong argument in favour of the precautionary principle: Just as it is sometimes more important to act in time than being exactly right, it is sometimes more important to avoid false negatives than to avoid false positives – depending on the values at stake.

It is therefore reasonable to handle this intuition in a similar way: When we make decisions in matters where some important value is at stake (e.g. human health), and when we suspect that a certain decision may result in serious damage to this value, *and* when we suspect that a false negative is a more substantial threat to the protection or promotion of this value than a false positive, then we should move our priorities from being biased towards avoiding false positives in the direction of avoiding false negatives.

It is important to see that it is not a matter of going from a system that is totally immune to false positives to one that is totally immune against false negatives. A system immune to false positives would not produce any statements about the world at all (only analytical statements would pass the test), while a system that is immune to false negatives would not be able to exclude anything other than pure contradictions. Everything would be considered as possible, and no possibility could ever be excluded from our considerations.

Changing priorities from being right in the direction of acting in time can be done simply by taking action sooner instead of waiting for more reliable information, but how do we, in practice, move our priorities from avoiding false positives to avoiding false negatives?

One way would be to transfer the burden of proof from those who claim that the practice or substance is dangerous to those who claim that it is safe in

[298] Gee 2006, Whiteside 2006 p.58
[299] Mattsson 2005 p.9, Wandall 2004 pp.269f, Wandall 2005
[300] For a discussion on the goals of science, see Wandall 2004 p.267

relation to the values in question. Instead of asking, "is this dangerous?", we ask "is this safe?". This is the solution Wandall suggests.[301] Analogously to her categorisation of the scientific urge to avoid false positives as a "conservative burden of proof", we might call this a "precautionary burden of proof".

The idea of shifting the burden of proof can be interpreted as an "either/or-solution". Either we place the burden of proof on one side, or we place it on the other. I think it would be more fruitful to go for a successive solution – as we have done in the previous three subsections. Just as something can be more or less valuable, a threat can be more or less severe, and timing can be more or less important, avoiding false negatives can be more or less important. What we need is a method that allows us to change focus in proportion to the importance of avoiding false negatives relative to the importance of avoiding false positives. We need to be able to increase or decrease the burden of proof successively on the different sides. One way of doing it could be by moving the confidence level. This will by no means capture the whole problem, which is quite complex and involves much more than just choosing the confidence level. Moving the confidence level must therefore not be seen as the whole solution. It is, however, a relatively simple method to start with. The scientist can, for instance, supply the decision makers with a set of answers based on different confidence levels. This would allow the decision makers to choose a confidence level that fits the distribution of the burden of proof that is appropriate given the importance of avoiding false negatives in relation to false positives. At the same time, the scientific community can choose to include only the answers based on the most conservative confidence level in the scientific corpus. It would also make the procedure more transparent and reduce the power that scientists have over deciding the relative importance of avoiding false positives versus avoiding false negatives on behalf of the entire society.

A weakness in this suggestion is that people lacking insight in how science works and what it is about, could point at the discrepancy in confidence level between the assertion incorporated in the scientific corpus and the assertion on which policy/legislation is based, and claim that the latter is not based on sound science or at least does not fulfil the most rigorous scientific demands. It is my humble hope, however, that it is possible to explain the process to these people. We need to point out the distinction between the scientific method and the choice of confidence level, and we also need to point out the difference in goals between science and society, i.e. keeping the scientific corpus clean on the one hand and protecting/promoting a host of other important values on the other. It would thus hopefully be possible for the public to understand that making decisions based on a confidence level that is less biased in favour of avoiding false positives is not the same as making decisions based on a less scientific method. Instead, it is a matter of making the scientific results more useful in relation to the different but just as legitimate goals of society in general.

[301] Wandall 2004 p.270

3.3.6. Conclusions

One important result from this section is that the precautionary principle in at least some decision situations seems to be acceptable – and probably even required – by basic moral intuitions. We have identified some such situations, viz.:

* When we deal with important values that tend to be systematically downplayed by traditional decision methods – such as human health.

* When we suspect that the decision might lead to severe consequences, especially when the consequences are suspected to be irreversible, and even more so when what we risk to lose is also irreplaceable.

* When timing is important.

* When it is important to avoid false negatives.

As we can see, the precautionary principle is based on a number of different intuitions. What we call the precautionary principle is therefore a conglomerate of several principles that has precaution as a common denominator.[302]

We have also found that precaution in relation to these intuitions is in general best expressed through moving the burden of proof. Since the values and problems we are dealing with can be more or less important or more or less severe, the burden of proof should be more or less heavy. In some situations it is rather a matter of gradually moving our priorities on the scale of timing versus accurateness, or on the scale of avoiding false negatives versus avoiding false positives depending on their relative importance for the values at stake.

3.4. Problems with the precautionary principle

There are some frequently occurring objections to the precautionary principle.[303] It has been accused of being ill defined, un-scientific or even anti-science, of hindering progress, increasing the total risk instead of decreasing it, and of trying to substitute science-based decision making by value-based or ideology-based decision making. In order to come to a reliable conclusion of whether the precautionary principle really is in accordance with basic moral intuitions, we have to take a closer look at these objections. I will start with the question of whether the precautionary principle is too poorly defined to be of any use.

[302] I will for simplicity go on using the term 'the precautionary principle' in singular.
[303] Sandin et al 2002 pp.287f, Sandin 2004:3 p.8

3.4.1. Is the precautionary principle ill defined?

Many observers have pointed out that the meaning of the principle is unclear.[304] Some authors believe that this is an inherent trait in the principle,[305] while others are confident that it is possible to come to terms with the obscurities.[306]

In the previous section, we also noticed that more work is needed in order to clarify the precautionary principle. On the other hand, we did manage to identify some basic intuitions behind the principle. Based on these intuitions in turn, we also managed to sketch out some ideas of how the precautionary principle should be interpreted and implemented.

The fact that there is more than one intuition behind the principle, and that the intuitions need to be accounted for in different ways, shows that what we call *the* precautionary principle is better thought of as several principles brought together under one heading. This may remove some of the confusion.

Are the remaining obscurities a terminal defect in the principle? I do not believe they are First of all, it seems clear that much more can be done in terms of clarification than we have done here. What is even more important is that the obscurities of the precautionary principle are not more serious than in most ethical norms. Even if ethical norms present us with difficulties when it comes to interpretation and implementation, it would not be advisable to stop using them.

We also have to be aware that to compare the precautionary principle to the more simplified traditional decision methods, *only* in terms of clarity would not be fair. The precautionary principle is invented in order to handle situations where the simpler solutions do not work. It is therefore only to be expected (though it is not a necessary truth) that the precautionary principle is more difficult to formulate in a clear and simple manner. To the extent that the traditional decision methods are clearer and simpler than the precautionary principle, it is so, to a large degree *because* they ignore the intuitions that the precautionary principle accounts for.

In the good tradition of Ockham's razor, simplicity makes a solution better than the alternatives *only* if the solution in question is also as good as, and as comprehensive as, the alternatives. A cost/benefit-analysis is not satisfying in those situations the precautionary principle is cut out to deal with, which means that its simplicity will be of no help.

Our conclusion is that the precautionary principle *is* ill defined and needs much improvement, *but* the problem does not seem to be fatal, *and* can probably be improved quite a lot. The precautionary principle is also better than the simpler alternatives when it comes to accounting for many basic moral intuitions – in spite of its obscurities.

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[304] Cooney & Dickson 2005:1 p.8, Gollier & Treich 2003 p.99, Munthe 1997, O'Riordan & Jordan 1995 pp.191f, 194,197, Sandin 1999 p.894, Sandin et al 2002 p.289, Turner & Hartzell 2004 passim, Whiteside 2006 pp.78f

[305] See e.g. Turner & Hartzell 2004 p.451

[306] See e.g. Sandin et al 2002 p.289

3.4.2. Is the precautionary principle anti-science?

The precautionary principle has been criticised for being unscientific and of marginalising the roll of science.[307] It has even been accused of being "anti-science".[308]

The precautionary principle tells us among other things not to wait for incontestable scientific proof of the dangerousness of a process before we take action against it. This clearly looks like the principle urges us to pay less attention to science – at least when we are short of time. Is this not an unscientific – not to say anti-scientific – way of making decisions compared to the more traditional method of scientifically analysing the risks and putting the probabilities into a cost/benefit-analysis? Not necessarily. The latter method works best when we virtually have the knowledge we need.[309] The question we have to answer is what to do when we do *not* have the information we need.

As we saw in section 3.2, there are different strategies for dealing with insufficient knowledge. Two of the strategies involve that we do not intervene until we know more. This may well be the most prudent choice in some situations of imperfect knowledge, for instance, if we are in an acceptable situation and suspect that any change can cause serious damage if it is not properly thought through. However, not all situations are like that. As we saw before, it is not uncommon that quite severe problems have been allowed to go on and in some cases to become even worse because we have waited for better evidence. In situations like that, the strategy of waiting for better knowledge does not seem like a good idea.

An alternative strategy presented in section 3.2 was to act from the best available information and hope it is correct. We saw then, however, that there are serious drawbacks in the form of risks that we do not do anything to protect ourselves from.

The fourth alternative was to use the precautionary principle. The way we have interpreted the principle, it tells us, among other things, that in situations when being too late is at least as problematic as being wrong, we need to adjust our decisions towards the "being-in-time" end of the "being-right/being-in-time" scale. The adjusting should be made according to how important it is to be in time relative to how important it is to be right in relation to the values at stake in the situation we are dealing with.

To decide the importance of being in time relative to the importance of being right is not easy. It is, none the less, routinely done by various decision makers. We do it every day. Businessmen and -women have to judge between being in time and being right in a market that constantly changes and where opportunities get lost. Military commanders have to make that kind of judgement as a part of almost every tactical and strategic decision, and so on. It is quite obvious that this kind of judgement cannot always be correct. However, if we

[307] O'Riordan & Jordan 1995 p.198, Sandin et al 2002 p.295, Whiteside 2006 p.29
[308] Grandjean 2004 pp.209, 214, Whiteside 2006 p.58
[309] Grandjean 2004 p.203

avoid the problem and simply assume that being right is the only important thing, then we have deliberately excluded an indisputably important dimension of the decision, and it is hard to see how that could be an improvement.

What is important as well is that the precautionary principle does not belittle the importance of being right. It claims that it is sometimes even more important to be in time. It is, so to speak, better to be approximately right and in time than being absolutely right but too late.[310]

It is also important to note that the precautionary principle does not tell us to stop searching for a better understanding.[311] An important implication of the concept of precaution is that decisions should be reviewed periodically in the light of new scientific findings.[312] This means that using the precautionary principle could even lead to more – not less – research being done.[313] It could therefore be argued that in this respect, the precautionary principle is promoting science rather than opposing it. Without the precautionary principle, we have the opposite situation: As long as we lack sufficient knowledge things can go on as usual, while more research might find out that what we are doing is dangerous. This gives an advantage to those who do *not* produce sufficient data to make a risk analysis,[314] which in turn seems to be a tempting incentive to block scientific progress. This is especially tempting in the frequently occurring situations where those who benefit from the practice are not the same people as those who run the risks if the practice turns out to be dangerous. In these cases, new information would be in the interest of the possible victims but not in the case of those who benefit from the practice. It is therefore probably tempting for those behind the practice to be less eager to find new information or even to try to block further research in the matter.

The precautionary principle does not stand in the way of science but advises us on what to do about a problem *while we wait* for the new information and the better understanding. There must reasonably be a policy for that – in addition to, not instead of – the policy that we should try to improve our knowledge. The time we have to wait for better knowledge is sometimes quite long, and what happens during that time may have rather far reaching consequences. I cannot see that it is more rational to have decision makers sitting down in inertia than to have them act in the most rational manner possible during the time it takes the scientists to form a better understanding of the situation. If we see someone drowning and wait until we are absolutely sure that she will in fact drown if we do not help her, then we will probably not get there in time to save her. If our criteria are really strict, we may not even be convinced until we have seen her drown – and then it is definitely too late. I believe that in good decision-making we always have to weigh the advantages of high certainty against the advantages

[310] Grandjean 2004 p.211
[311] In fact in the EU interpretation it is explicitly stated that "scientific research shall be continued". See Grandjean 2004 p.206
[312] Grandjean 2004 pp.210,214, Lin 2001 p.131, Sandin 2004:1 p.10
[313] Grandjean 2004 pp.210,214, Whiteside 2006 pp.30, 53
[314] Grandjean 2004 p.208

of acting fast. True, acting on incomplete knowledge can worsen the situation, but so can inertia as we have seen. We have thus returned to the question: Which aspect – the being-right aspect or the being-in-time aspect – is the most important one in the situation at hand given the values at stake? The precautionary principle lets the being-in-time aspect enter the procedure without excluding the being-right aspect.

It could be argued that just by letting in the "being-in-time" aspect we do in fact marginalise science since it means that we allow for the possibility of moving our priorities at least to some extent away from the "being-right" aspect. It is also quite reasonable to believe that the quality of the decision *will* decrease if we base it on less scientific evidence.[315] It can therefore not be denied that the precautionary principle to some extent diminishes the role of science *and* that this is bad. We have to remember, however, that *not* using the precautionary principle diminishes the time aspect *and* that this is bad. We are therefore back to the conclusion in 3.3.4: Both being-right and being-in-time is instrumentally valuable, but we cannot always achieve both to the same degree and sometimes one is more pressing than the other and it is not given beforehand that it is always the former.

Sandin et al point out another thing that is important to remember when we discuss the relation of the precautionary principle to science: The term 'unscientific' can be interpreted in a weak way and in a strong way. A decision is, according to this distinction, unscientific in the weak way if it does not build on scientific evidence, while it is unscientific in the strong sense if it disregards scientific evidence. Since the precautionary principle tells us what to do in situations where there is insufficient scientific evidence, it is unscientific in the weak sense of the word, but not in the strong sense.[316]

We should also point out that not using the precautionary principle and doing nothing until we are totally sure, would, in fact, also be unscientific in the weak sense. It tells us to make a certain decision (in this case to wait) that is not based on science (remember that the reason for the suggested inertia is that we lack scientific evidence).

3.4.3. Values instead of science

The precautionary principle is sometimes seen as an attempt to substitute science with values, which is considered as a strong objection against the principle.[317]

[315] Sandin et al 2002 p.295
[316] Sandin et al 2002 pp.295f
[317] Sandin et al 2002 pp.287f, 294. The precautionary principle is also accused for substituting science with politics. The reasoning then seems to go along the same lines (Whiteside 2006 pp.150ff).

I think it is quite clear that the precautionary principle contains value statements and that the motives behind the principle are a matter of values (see section 3.3). However, the precautionary principle is not supposed to be a description of the world, but a decision method. All decisions are valuations. If we have no values, we cannot make any decision. To say that we should do A rather than not-A is to say that A is *better* than not-A. I.e. we have made a value statement. Any alternative decision procedure must also be based on values, and as a matter of fact, the existing alternative decision procedures, like risk analysis, are based on values as well.[318]

One important motivation behind the precautionary principle is to promote or protect certain values like human health, but – again – decision procedures that do not tell us to be particularly careful when, for example, human health is at stake are equally evaluative – only in another direction. Not to be particularly careful about human health is also a value. In section 3.3.3 we saw that the traditional decision methods are biased in favour of economic profit. We may also remember that the criteria for what statements to incorporate in the scientific corpus are, in fact, based on values (so called epistemic values).[319] In section 3.3.5 we saw an example in the form of the evaluation that false positives are worse than false negatives. The scientific community even evaluates how much worse a false positive is when they chose a particular confidence level. I believe that one of the major virtues of the precautionary principle is that it takes the evaluative aspect that is already there in all decisions whether we like it or not, and brings it out into the open and makes it a subject of discussion and deliberation.

To base decisions on sound science is excellent and should always be strived for, and there is nothing in the precautionary principle that tells us not to use the best available scientific evidence, or to look for better scientific evidence. To hide evaluative considerations behind a veil of quasi objectivity, on the other hand, is not an acceptable way of making decisions, *and* it does not make the decision more scientific. It only makes it look that way and is thereby less honest. It has been, and still is, very easy to brand decision criteria and decision methods that favour the environment or human health as being evaluative while the promotion of economic profit is seen as the default value or even as no value at all. This is a way of making decisions that is worrying, and if the precautionary principle can contribute to bringing the hidden values out in the open, it must reasonably be an argument in favour of the principle – not against it.

The precautionary principle is thus not a matter of substituting science with values but of substituting values with values – and of making the values more clearly visible.

There is still one aspect of the precautionary principle that may be interpreted as substituting science with values. We have seen that when important values are at stake and the uncertainty is large, we should, according to the precautionary principle, be extra careful not to jeopardise the values. This can

[318] Grandjean 2004 p.209, Sandin et al 2002 p.294
[319] Wandall 2004 p.267

be interpreted as saying that if the uncertainty regarding the probability part of a risk assessment is large, then we should give less weight to the probability part of the equation, and more to the value of the possible outcome.

Strictly speaking, this is not a matter of substituting science with values since the precautionary principle does not tell us to stop looking for better predictions – or to disregard the evidence we do have. What it tells us to do is to distrust uncertain results (which seems like a sound scientific approach), and to adjust our decision method in light of the uncertainties in the predictions. Uncertainties concerning a scientific result must be a part of the scientific result and therefore accounted for by the researcher *and* used in the decision procedure. If the uncertainty is such that an error in one direction would be worse than an error in the other direction in relation to the values at stake, it would no doubt be irrational not to account for that in the decision.

3.4.4. Favouring the status quo

It is often claimed that the precautionary principle demands an unreasonably high degree of certainty from new methods and technologies, and therefore is biased in favour of the status quo and against progress and innovation.[320] It is even claimed that if the precautionary principle were consistently applied, it would in effect lead to a halt for all innovation.[321]

One part of the explanation why many people have made this interpretation might be that people believe 'precaution' to simply mean 'prohibition'.[322] That is, however, a clear oversimplification. Being cautious is far from the same thing as banning all new ideas. Precaution also includes a lot of other things than prohibitions. In many cases it demands more research and innovation in order to deal with uncertainties regarding already existing substances or ongoing practices. [323]

Another explanation for why people believe that the precautionary principle is biased in favour of the status quo might be that people associate 'precaution' with 'caution' and 'caution' with 'inertia'.[324] The precautionary principle has probably been used in that way at least occasionally by political decision

[320] Cooney & Dickson 2005 p.8, Cuccio 2005, Miller & Conko 2001, Whiteside 2006 pp.41, 52
[321] Gollier & Treich 2003 p.98, Grandjean 2004 p.208, Hermele 1995 p.113, Whiteside 2006 pp.40, 63
[322] Whiteside 2006 p.52
[323] Whiteside 2006 p.52
[324] Donna Maher (Maher 1999-2000) points out the difference between 'caution' and 'inertia'. It is probably also important to distinguish between 'caution' and 'precaution' since a shift between these two terms seems to be quite common in the debate concerning the precautionary principle.

makers.[325] I do not believe that this is the proper way of using the principle, however. In fact, none of the classical formulations even indicate such an interpretation. For instance, the Rio formulation explicitly urges us to "take measures". That is difficult to interpret as favouring inertia.

If the precautionary principle told us to take precautionary measures only when it comes to new ideas, or demanded a higher degree of security for new ideas than for old,[326] it would be correct to say that it is biased towards status quo. However, nothing in the classical formulations – or in my conclusions – points in that direction.[327]

Consider the intuitions we discussed in section 3.3. Only the first of the investigated intuitions seems to indicate a bias towards status quo. If the main motivation behind the principle were the intuition that avoiding the negative is more important than promoting the positive, it would probably, depending on how we interpret the idea (see section 3.3.1), make sense to be more cautious against new ideas than against old ones.[328] However, as Munthe points out, it would not *always* make sense. In some cases we could use a new invention or idea to stop an ongoing change for the worse. This means that even the intuition that the negative carries larger weight than the positive can in some cases favour innovation (again, depending on how the intuition should be interpreted). However, in most cases a precautionary principle based on the intuition that it is more important to avoid the negative than to promote the positive, would be biased towards the status quo.[329]

The intuition that it is more important to avoid the negative than to promote the positive is, however, as we saw in sub-section 3.3.1, very controversial, and it suffers from problems concerning both how it should be understood, and how it should be justified. I therefore chose not to use that intuition in my conclusions of how the principle should be interpreted and applied, and I will not use it here to open up for an interpretation of the precautionary principle that favours the status quo. Even if it was used it would not be the only principle, however, and in most cases the other principles would probably overturn the bias for status quo exerted by that intuition.

One reason why the precautionary principle has been seen as a threat to progress and innovation might be found in the way we define 'progress' or 'innovation'. There is a considerable difference between *stopping* progress or innovation, and *redirecting* them.[330] The precautionary principle will probably stop some innovations that are deemed less safe. On the other hand, it also ought

[325] To put the burden of proof on those who want to change the existing order has also been advocated by Holmes Rolston III. He is, however, an advocate of ecocentrism, and not of anthropocentric instrumentalism as we are discussing here. See Rolston 1994 pp.31f

[326] Lin 2001 p.129

[327] Even if the precautionary principle has often been applied in a way that favours the status quo, we can at least see a tendency in the other direction in the new EU-regulation of chemical substances (REACH). One of the most important principles in REACH is that not only new chemicals, but also chemicals already in use, are to be tested.

[328] Munthe 1997

[329] Munthe 1997

[330] Herremoës et al 2001 p.182

to give a competitive advantage to those who develop safer alternatives, and thereby in fact encourage some types of innovation.[331]

People who profit from a particular development probably tend to see it as a progress even if other people suffer from it or would gain much more if the development took another direction. In the same way, people who profit from a particular development might see any deviation from *that particular development* as an obstacle for *development, period*, even if it as a matter of fact means a promotion of *other types of development*.

This is reminiscent of the problem discussed in sub-section 2.3.3 that decisions are often based on an egocentric definition of 'profit' and 'loss'. The definitions of 'progress' and 'innovation' may suffer from the same problem.[332] If so, it may be that at least some of the worries regarding the precautionary principle are due to some people's worries that technology will develop in a *different* direction (that is less profitable from their own perspective) rather than a worry that development and innovation in general will be hindered. From an utilitaristic viewpoint that kind of worries is unproblematic as long as the development is progressing in a way that is generally an improvement. From a deontologic viewpoint we should be able to compensate those who lose out on the deal – if we feel that someone should be compensated for the loss of a profit that otherwise would be made on behalf of the safety of the public.

3.4.5. Ignoring other risks

One argument that has been launched against the precautionary principle is that it neglects the fact that by focusing too much on one risk we may increase another risk or even the total sum of risks.[333] According to the critics, the precautionary principle may, for example, urge us to spend so much money on avoiding one risk that we do not have enough money left to deal with other, maybe even larger, risks.[334] It might also be that putting too much effort into avoiding a certain risk means that we will have to abstain from projects that would all things considered render more positive than negative effects. I.e. we risk losing opportunity value.[335] It might even be that by banning one particular substance or process, we will end up in a situation that is actually worse.[336] If we for precautionary reasons stop using a certain pesticide, it may increase the risk for

[331] Herremoës et al 2001 p.182
[332] I.e. 'problem' from a general anthropocentric basis as we use in this investigation. From an egocentric viewpoint, it would not be a problem.
[333] Grandjean et al 2004 p.383, Sandin 2004:1 pp.3f, Sandin 2004:3 pp.8f, Whiteside 2006 p.44
[334] Sandin 1999 p.894, Sandin et al 2002 p.293
[335] Cooney & Dickson 2005 p.8, Herremoës et al p.175, 194, Kuntz-Duriseti 2004 p.291, Munthe 1997, Sandin 1999 p.894, Turner & Hartzell 2004 p.454, Whiteside 2006 p.5
[336] Cooney & Dickinson 2005 p.13, Kuntz-Duriseti 2004 p.291

crop failure and as a result cause famine.[337] If we say no to a certain genetically modified crop, it might lead to a continued use of pesticides and fertilisers that we could have avoided by genetic modification,[338] and if we abstain from using a certain chemical because of its neurotoxicity the result may be that we instead use another chemical that is carcinogenic.[339]

Sandin's way of dealing with this problem is simply to be very clear that the precautionary principle is precautionary in relation to a particular risk, not to the total sum of risks.[340] By being clear about this, we avoid a situation where people are misled to thinking that we have attacked all risks while we in fact have discussed one particular risk.

Sandin's suggestion would make the shortcomings of the principle clearer and therefore the principle more honest, but it does not, as Sandin admits,[341] help us get rid of the shortcomings. If the precautionary principle persistently tends to increase the total risk, it does not help to point out that it is not meant to deal with the total risk. The principle will still be worthless and should not be used. What we need, in order to save the principle, is rather a formulation that acknowledges and handles the fact that some ways of dealing with some risks may increase other risks. That does not seem like an impossible task. What we have to do is to formulate the principle in such a way that it is applicable to the *whole* situation.

I therefore prefer Sandin's et al earlier analysis in which they point out that if we stress one risk too strongly and therefore neglect another risk, we have a too narrow horizon. They also point out that this is not just a problem for the precautionary principle. It is, in fact, something that has to be dealt with by all decision principles.[342] We have the same problem if we base our decisions on the strategy "always try to maximise utility": If we concentrate too much on maximising utility in one situation, we may fail to maximise total utility.[343] This is not an argument against trying to maximize utility, however. It is only an argument against being too narrow in our considerations. The solution in this case is to include as many factors as we can in the decision.

We can reason in the same way regarding the precautionary principle: If we concentrate too much on avoiding a certain risk, we may increase the total risk. This is not an argument against trying precaution, however. It is only an argument against being too narrow in our considerations. The solution in this case, just like when we talked about utility maximisation, is to include as many factors as we can in the decision.

Whiteside goes about the problem in a similar manner. He points out that the habit of looking at risks in isolation is no more attributable to the precautionary principle than it is to traditional risk assessment.[344] On the contrary

[337] Sandin et al 2002 p.293
[338] Munthe 1997
[339] Sandin et al 2002 p.293
[340] Sandin 2004:1 pp.7f, Sandin 2004:3 p.9
[341] Sandin 2004:3 p.9
[342] This is also pointed out by Östberg 1993 p.27
[343] Sandin et al 2002 p.293
[344] Whiteside 2006 p56

he claims, decisions under the precautionary principle are more prone to look at the whole picture contrary to traditional decision-making that, according to Whiteside, is more reductionist.[345]

Including more factors seems to make the principle considerably more complicated. The precautionary principle is invented in order to be used in situations where we have incomplete information about the risks involved. This in turn makes it difficult to include more information in the decision. There are other kinds of information that can be included, however, and that would help us make a more rational decision regarding the total risk. If we look at the interpretations in section 3.3, the precautionary principle tells us to consider things like the values at stake, the importance of being in time, the degree of suspicion, etc. All these considerations can be applied to the whole situation. We can compare the values at stake and we can compare the importance of being in time for different values, etc. It makes the decision more complicated, but no more unfeasible than a traditional utilitarian calculation.

Consider the example of genetic modification versus pesticides and fertilisers: If we say no to a certain genetically modified crop, it might lead to a continued use of pesticides and fertilisers that we could have avoided by genetic modification. If we apply the precautionary principle to the situation as a whole, we would have to compare the risks we run in the different situations. Let us assume that we know approximately what risks we run by continuing the use of pesticides and fertilisers, but that we only have some unconfirmed suspicions about the risks we would run as a result of genetic modification. If we do not apply the precautionary principle, the solution is simple: We do not know for certain that there are any risks involved in genetic modification, so we have no reason to avoid it.

What, then, if we apply the precautionary principle? The principle does *not* tell us *always* to avoid the uncertain risk and run for the known risk. At least that does not follow from the conclusions in this work, and I have found nothing in the standard formulations pointing in that direction. Neither should we just wait and see while continuing with "business as usual", or be satisfied with just making our decisions based on the present state of knowledge regarding the probabilities. Instead, the precautionary principle exhorts us to make a decision involving all relevant factors that were identified in section 3.3. We have to look at the values involved, and at how the different values can be threatened by the use of pesticides and fertilisers, and by genetic modification respectively. We would also have to factor in the uncertainties regarding our suspicion against genetic modification. We would of course have to look at the expected benefits of the different approaches – and at the uncertainties regarding our expectations of the benefits. We would have to consider whether any of the potential harms would be irreversible, and we would have to consider whether time is particularly important somewhere in the process, etc. All these considerations would need a lot of research and deliberation, and it would certainly not be possible to be

[345] Whiteside 2006 pp.56f

correct all the time. It still seems like a more rational alternative compared to disregarding these aspects and *only* looking at how well identified the risks are for the respective alternatives.

In the previous sub-section, as well as in the sub-section on irreversibility in section 3.3, we pointed out that an important aspect of precaution is that we have to be prepared to re-evaluate our decision in the light of better knowledge. This is also relevant in relation to the present problem.[346] If we chose an attitude of precaution, we should be able to re-evaluate and, if necessary, reverse the decision if better knowledge shows that it has increased the total risk. This shows – again – that irreversibility is an important aspect to consider when we make decisions that are potentially harmful. We should make sure that it is possible to change a decision in the light of better knowledge, and therefore try to avoid irreversible effects – at least when we suspect that the irreversible effects can be unacceptably harmful, and the more severe they are suspected to be and the stronger the suspicion, the more careful we should be to avoid irreversible effects.

Let us finally take a look at the claim that the principle pays too much attention to potential harm and forgets the potential benefits.[347] It is claimed that if we are too aversive towards risk, we will miss out on many benefits – something that is seen as irrational. Elliot Sober, for example, argues that most of us are prepared to accept a small chance for a great disaster in return for a high probability for a modest benefit. He makes an analogy with flying where he points out that most of us believe it is rational to fly in order to save time even though there is a small probability we will crash and even though there are safer but less convenient alternatives.[348] He also extends this reasoning to the question of preservation of species, and argues that it is not rational to preserve a species solely because we do not know whether it may turn out to be valuable later. He points out that if we do not know the future value of a species, the value can just as well turn out to be negative.[349]

Interestingly, Sober is actually contradicting himself when he turns from flying to species preservation since the latter is in fact not an example of how we put larger emphasis on harm than on benefit, but, given that he is right in his reasoning, instead an example of how we only consider potential benefits and not potential harm.

I believe that the argument for preservation based on our ignorance of the future value of a species is neither a matter of emphasising potential harm over potential benefit, nor the opposite. I believe instead that it has to do with irreversibility. If the species goes extinct, we cannot get it back if we would need it. If we save it, on the other hand, it is easier (though not necessarily easy) to exterminate it later if it turns out to be harmful.

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[346] Wandall 2004 p.271
[347] Herremoës et al p.175
[348] Sober 1986 p.176
[349] Sober 1986 p.176

Nevertheless, the precautionary principle has doubtlessly in some cases been used in a way that gives priority to avoiding harm over promoting benefits. If we had accepted the intuition that it is more important to avoid negative events, it would be perfectly rational. Since we have chosen not to accept that intuition, however, there seems to be no reason why the principle should pay more attention to potential harm than to potential benefits.

One alternative, or complementing, explanation as to why the precautionary principle has been perceived as giving more weight to potential harm than to potential benefits might be found in what is considered to be a 'harm' and what is considered to be a 'benefit'. We saw above (sub-section 3.3.3) that the value of the environment and human health has often been downplayed in traditional decision methods. The precautionary principle is often evoked in situations where the potential benefit from a decision is economic while the potential harm concerns human health or the environment. It may therefore look like harm gets more attention than benefit by the precautionary principle. Though what actually happens, I believe, is that the values that have been notoriously subjected to harm get upgraded and better protected – not as a result of changing the way we weigh harm in relation to benefit, but as a result of how we value human health and the environment.

Herremoës et al also point out that claims to the effect that a process has certain benefits actually do need more attention. Not in the way of being assigned more weight, but by being subject to more thorough investigation.[350] They argue that there should be a burden of proof placed on those who point out the potential benefits and not just on those who point out the potential harms.

Such a demand seems reasonable and does not presuppose an asymmetric weighing of positive and negative effects. On the contrary, if we put equal weight to positive and negative effects, it is very reasonable that the burden of proof should not fall exclusively on one side. Instead, claims of potential harm and claims of potential benefit should be subject to equally hard scrutinising. Since the burden of proof, up to now, has been almost exclusively placed on those who express worries regarding human health and the environment, and since much of the harm that has resulted from different projects has fallen upon human health and the environment. A more equal distribution of the burden of proof necessarily means a larger weight on those pointing out expected economic benefits. That does not mean that the distribution was fair before and is now askew, however. On the contrary, the precautionary principle, used correctly, corrects the prevalent distortions.

[350] Herremoës et al p.175

3.4.6. Does the precautionary principle lure us into a paradox?

It has been argued that the precautionary principle demands that we forbid *everything*,[351] and that this leads to a paradox by demanding that we ban every action as well as every non-action.[352]

One of the basic features of the precautionary principle is said to be that we take the burden of proof from those who want a ban and place it on those who do not want a ban. Instead of demanding proof that something is dangerous before forbidding it, we demand proof that it is safe before allowing it. However, abstaining from an act – any act – will also involve risks, which means that we end up with a ban of both the performance and the non-performance of all acts.[353]

Sandin considers this an argument against formulating the precautionary principle in global terms, and in favour of formulating it in terms of precaution against some particular potential harm.[354] This will not help us though. Even if we concentrate on one particular harm, the decision we are considering will still carry some very small probability of bringing about this harm. Every act – and non-act – can, by some weird chain of coincidences, result in just about anything. For instance, we may follow Sandin's advice and use the precautionary principle only for some particular risk, say the possible extinction of mankind. Me putting on the right shoe first instead of the left may under some extreme circumstances, and by some weird chain of coincidences lead to the actualisation of this risk. We would therefore have to prohibit me from putting on the right shoe first. In fact, we would also have to prohibit me from putting on the left shoe first – and from not putting on any shoe at all as well as from not wearing any shoes. Since all these alternatives have some minute probability of causing the extinction of mankind, we would thus be left in the dilemma we started with.

Maybe we can adapt Sandin's proposal to limiting the scope of the precautionary principle, not to one particular *outcome*, but to one particular *decision*. The decision can be in the form of performing a particular act or of not performing that act, but it cannot be applicable to both alternatives. We might then say that "prohibiting me from putting on the right shoe first or not putting on the shoes at all can have negative effects, but this does not have to concern us since we are only discussing precaution in relation to putting on the left shoe first". This way we would avoid the paradox. It would, however, also make the precautionary principle rather uninteresting.

Sandin et al do point to an important fact however: None of the authoritative formulations of the precautionary principle, in fact, require absolute

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[351] Munthe 1997, Sandin et al 2002 pp.290f, Sandin 2004:1 pp.3f, Whiteside 2006 pp.29, 52

[352] Munthe 1997, Sandin 2004:1 pp.1, 3f, Whiteside 2006 p.48

[353] Sandin et al 2002 p.291, Sandin 2004:3 p.10. Turner & Hartzell 2004 pp.450f have compared this paradox to Pascal's wager, which seems to be a very good analogy. Whiteside 2006 p.40 mentions that some critics have also, in the spirit of the objection I discuss in this section, compared the precautionary principle with Pascal's wager.

[354] Sandin 2004:3 p.10

proof of safety.[355] This is important, since the opponents of the principle have to assume that it does demand absolute, or at least, very extreme levels of proof. I.e., in order to end up in the situations described above, we must have an extreme epistemic threshold, at least when it comes to convincing us that something is safe. The classical formulations of the precautionary principle do not assume such a high epistemic threshold, however, and neither do my interpretation from section 3.3. The argument that the precautionary principle will lead to a ban of everything and ultimately end up in a paradox therefore looks like a "straw man-argument". That is, it attacks an enemy that is just made up by those launching the attack. The paradox-objection argues against a position (the extremely high epistemic threshold) that is in fact not a part of the precautionary principle.

We must also remember that the precautionary principle is intended to come into play in situations where we have *some* indication that the act in question is a threat to some important value. Just as there must be a correlation between the importance of a value and the proof we demand that a process is not a threat to this value, we also need some correlation between these things and the strength of the indication that the process in question might be harmful.[356]

Sandin et al suggest that we apply a de minimis principle, i.e. a limit on how small probabilities that should be counted.[357] The question is what would be a reasonable limit. My suggestion is that we use a flexible system in which the limit is decided by the value at stake, the severity of the potential harm, and the degree of suspicion against the process we discuss. That is to say, the more important the value at stake, the more severe the suspected outcome, and the stronger our suspicion, the lower the probability we should accept.

3.4.7. How do we prove a negative?

Shifting the burden of proof is one of the main features of the precautionary principle. There is one seemingly important problem, however. The problem is that we have an asymmetry in the very nature of "showing something to be the case". It only takes one incident to show that a certain process can harm a particular value, while we can never be absolutely sure that a process is safe in relation to that particular value – especially in the long run.

[355] Sandin et al 2002 p.291
[356] Herremoës et al (ed.) 2001 p.170, Sandin et al 2002 pp.290, 291, and Turner & Hartzell 2004 p.456 bring up the question of correlation between degree of suspicion and demand of proof.
[357] Sandin et al 2002 pp.291f

The question is therefore: How do we prove that something is safe? In other words, how many negative results does it take to prove that there are no severe effects?[358]

The answer is, once again, that this is a problem only if we have an extremely high epistemic threshold, e.g. if we demand absolute certainty. We have seen that none of the classic formulations of the principle urge us to adopt such an extreme threshold, and the same goes for my interpretation of the principle. In my interpretation it is a matter of a gradual change of the burden of proof in relation to the values, threats etc. that are at stake. The more valuable, the larger our suspicion, and the larger the suspected threat, the higher the threshold ought to be. Absolute certainty is not possible and cannot be demanded.

3.5. What can the precautionary principle do for us?

Is the precautionary principle applicable to the subject of extinction? It has, in fact, been applied to this question by several official documents.[359] In order to motivate the precautionary principle, the Wingspread document explicitly mentions extinction as one of the areas where traditional decision methods have failed.[360] The Rio declaration does not explicitly talk about extinction, but claims that the precautionary principle should be used in situations of (a) serious damage, (b) irreversible damage, and (c) lack of full scientific certainty. These are all salient aspects of species extinction: The extinction of species is typically irreversible. There are many uncertainties concerning the species issue. There are suspicions that extinction will harm some very important values. There are nonlinear effects that increase the uncertainties,[361] and make the question of timing extra important. If the species loss results in a loss of an ecosystem service, that too, will typically be an irreversible loss, and a very serious one. All of the things mentioned here turned out in section 3.3 to be precisely the kinds of things that the precautionary principle is meant to deal with.

Bryan G. Norton compares the rivet popping analogy by Ehrlich and Ehrlich (see section 2.7 above), to a phenomenon called "zero-infinity dilemmas".[362] A zero-infinity dilemma is a situation in which the probability for something to go wrong is very small, while the effects if it does are

[358] Gee 2006
[359] Cooney 2005 pp.6f, Cooney & Dickson 2005 pp.10f, Cooney & Dickson 2005:2 p.xxi, McGarvin 2001 p.23
[360] Wingspread Conference 1998
[361] Daily 2000 p.336
[362] Norton 1986:1 p.121, Norton 1987 pp.67ff

catastrophic.[363] If too many species disappear from an ecosystem, the ecosystem may break down. The same could, according to Norton, be the case with the entire biosphere. For each single species, the probability that the extinction of that particular species would cause the breakdown is very small, but if it does, the consequences would be very serious indeed.[364]

This too, looks like a good reason for applying the precautionary principle to the question of extinction. The important thing to note is that the principle tells us not to be satisfied with an ordinary risk analysis. It urges us to take into account the uncertainty concerning the probability (there is no way we can know in advance whether the species in question will be the one that causes the break down). It also urges us to consider both the value of the ecosystem at risk, the harm that may be caused to this value, the uncertainties concerning these aspects, and the aspect of irreversibility. It finally tells us that as a result of these considerations we must adjust, and quite possibly, the burden of proof for those who want to take the risk.

Norton is not alone in concentrating on the possible breakdown of ecosystems and the loss of ecosystem services. The UN Millennium Ecosystem Assessment group also belongs to this category. They reason in three steps:

2. They start by pointing out that working ecosystems provide us with many important ecosystem services.
3. They then stress the importance of biodiversity for properly working ecosystems.
4. Finally, they argue that since so much is at stake, and since we have good reasons to believe that biodiversity is important for the ecosystems to work, but do not know exactly how, we ought to apply the precautionary principle.

In our case, since the ecosystem services are very valuable and since there is a strong suspicion that loss of biodiversity may eventually be detrimental to this value, we should demand very strong evidence that the species under consideration will not be the one that breaks the neck of an ecosystem service. However, since we cannot know that in advance, we ought instead to demand good evidence that a certain practice will not cause extinction.

Protection of ecosystems and ecosystem services is not the only reason to apply the precautionary principle to the species issue, however. Other species supply us with a host of different instrumental values. In some cases the exploitation of these values risk causing extinction of the species. As we have seen, exploiting a species to the degree that it goes extinct may in some cases be economically rational from an anthropocentric viewpoint. This is, however, something we do not always know for sure. In sub-section 3.3.2 we noted that when an act might result in an irreversible change, we need extra strong evidence against any suspicion that the change will result in serious problems, for

[363] This is the standard definition. Norton adds a list of other criteria that are characteristic of extinction in particular. I believe, however, that the simpler standard definition is sufficient for the point I am going to make.
[364] Norton 1986:1 p.121, Norton 1987 pp.67ff

example, by destroying or depleting a resource that would afterwards turn out to be more valuable in its original state. This is clearly applicable to the situation we discuss here. Extinction is, as we have seen, irreversible (at least in practice if not in theory) and we cannot know now what the value of the species will be for future generations of human beings. We also have to remember that there are much uncertainty regarding the function of ecosystems and the relations between different species. We have not even discovered all species yet, and many of the species that are discovered are quite poorly described. Many of these species may, in the future, turn out to be important e.g. for medicine or agriculture,[365] and at least some of the species for which we have found no direct use, may in the future evolve in such a direction that they will become useful. Some species are probably also important for the future existence or development of other species that in turn will become useful. When combined with the irreversibility of extinction, and with the extensive historical evidence that species have time and again turned out to be valuable in unexpected ways,[366] it seems that we have a strong reason to place a rather heavy burden of proof on projects that might result in the extinction of species.

[365] Regan, Donald H 1986 p.195
[366] Gärdenfors 2005 p.119

4. Future Generations

Ghillean Prance believes that we would manage the rainforests very differently (presumably better) if we thought more about our "great-great-great-great-great-grandchildren".[367] That might be true, but do we have a moral duty to change our management of the rainforests out of concern for our great-great-great-great-great-grandchildren? Do we, to put the question in terms more suitable for our investigation, have a moral duty to preserve species for the benefit of future generations of human beings? Political and legislative documents sometimes express such a duty. Both the Brundtland report and the Rio declaration for instance explicitly tell us that we do have such a duty,[368] and the Swedish national goal for protecting plants and animals is partly motivated by a concern for future generations of human beings.[369] In his survey of official governmental and intergovernmental policy texts, Mikael Stenmark has identified a general idea of what he calls 'intergenerational justice', meaning that we have a moral obligation to consider the needs of future generations of human beings.[370]

It is not totally clear what this means. The official policy documents seldom state very precisely how they conceive of our duties to future generations.[371] I think it is quite clear though, that most people do recognise some kind of moral duties towards future generations. It also seems quite clear that for many people this is a strong argument for nature conservation.[372] It is not uncommon to hear people argue that we need to preserve nature, ecosystems or species for the sake of future generations.

According to Stenmark, the idea that we have duties not just to our children and grandchildren, but also further into the future, was a genuinely new idea in international policy when it was promoted by the Brundtland report. Stenmark believes that the change is induced by necessity due to the new insights in our dependence on nature, of the possibility that some natural resources will eventually run out, and of the fact that there are limits to what nature can absorb in terms of human interference.[373] He also puts his finger on the question of how far into the future our concerns should reach, and the question of whether our concern for future generations should decrease with time.[374]

Our concern is whether a duty towards future human generations can explain at least a part of why extinction is conceived of as a moral problem. In order to answer that question we have to investigate whether we have such a duty at all, and also its possible scope and demands. These questions have been the

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[367] Prance 1990 p.64
[368] Melin 2001 passim, Rolston 1988 p.274, Stenmark 2000 pp.29f, 34, 49ff, Rio Declaration §3, World Commission on Environment and Development 1987 pp.x, 8, 27, 57
[369] Swedish Environmental Agency web portal on environmental objective 16
[370] Stenmark 2000 p.37
[371] Melin 2001 p.104, Stenmark 2000 pp.8, 52f, 56f, 62ff
[372] See e.g. Attfield 1998 p.220, Fagerström 2003, Gärdenfors 2005 p.119, Rolston 1994 p.131, Stenmark 2000 p.181
[373] Stenmark 2000 pp.8, 49ff
[374] Stenmark 2000 pp.67f

subject of an intensive debate and I will discuss here what I believe are the most serious objections and proposed limitations to the moral standing of future generations.

4.1. The asymmetry problem

4.1.1 The auditorium dilemma

One salient feature in most of our relations with future generations is that they work only one way: Much of what we do will affect them, but almost nothing they do can affect us.[375] Parfit illustrates our relations to future generations with 'the auditorium dilemma'.[376] In some auditoriums, the first row can gain a better view by standing. Standing up is less comfortable than sitting down, but in some situations it might be worth the discomfort to get a better view. This presents a problem for the second row. They originally had a view that was good enough and they had no reason to endure the discomfort of standing. It was therefore in their interest to remain seated. If the first row stands up, however, the second row will not see anything. Therefore, they also have to stand up in order to regain their view. This will make their situation worse compared to how it was from the beginning. By standing up, they will have the same view as before but they will be less comfortable. The same goes for the row behind them and so on for the rest of the rows. When all rows are standing up, all but the first row will have the same view as before but be less comfortable. The first row will be less comfortable but have a better view. The result is that the first row will be better off while all other rows will be worse off.

We can see this as an analogy to intergenerational relations where the first row is the present generation and the second row the generation after that, etc. What the first row does will have effects on the next generation and so on but what a later generation does will not affect the generation before it.

The 'auditorium dilemma' differs from, for example, the 'prisoner's dilemma' by having one group that is untouchable by the others (being the "outsiders" as Parfit calls it).[377] This means that there is no way we can make a deal that will be acceptable to everyone based on strict rational egoism.

Another salient feature of this dilemma is that the luxury of being untouchable is transferred from row to row together with the bad effects of the acts done by the first row. This means that there is always a very strong

[375] Barry 1996 p.209, Martinez-Alier 1994 p.xviii, Narveson 1996 pp.39f, World Commission on Environment and Development 1987 p.8
[376] Parfit 1987 p.383 note 19b
[377] Parfit 1987 p.383 note 19b

temptation for every row to deal with the problem created by the row in front of them in a way that makes the situation worse for the row behind them. Even though it is worse to stand and have a good view than to sit and have a good view, it is even worse to sit and have a bad view. Analogously, it is always a tempting alternative for every new generation to soften the impact from the things done by the previous generation by passing on as much as they can of the bad effects to the next generation.

The auditorium dilemma is a good analogy for the case of future generations and natural resources, ecosystem services, etc. We can improve our lives by over exploiting resources (including other species) in a way that will affect future generations. The only thing they can do to deal with the situation we have put them in is to continue consuming resources as long as there are any left, and thereby pass as much as they can of the problem on to future generations. In fact, the intergenerational problem is worse than the auditorium dilemma since by consuming resources at a pace that exceeds the regeneration rate or by consuming non-renewable resources, the problem will not just be passed on. It will also be worsened. If we add a growing human population it will become even worse.

The asymmetry problem does not present an obstacle for including future generations in the realm of moral objects as long as our criteria for being a moral object do not presuppose a reciprocal relation between the object and the agent. For theories that do demand a reciprocal relation – like contractualism and communitarianism – it is problematic however. I will therefore look at some attempts to fit inter-generational duties into these theories.

4.1.2 Contractualism

Both Derek Parfit and Brian Barry claim that the asymmetry problem in fact shows that contractualism does not admit to duties to future generations since future people are not able to enter into mutual contracts with us.[378] Barry Gower points out that it is possible to have a reciprocal arrangement between over-lapping generations, but not between non-overlapping ones. He therefore concludes that there cannot, according to formal theories of justice, be such a thing as justice or injustice in our relations with generations further into the future.[379] Gower's conclusion is thus just a little weaker than Parfit's and Barry's, but he seems to agree with their main idea.

Is this conclusion correct or is there any way in which a true reciprocal theory can deal with the asymmetry problem?

[378] Parfit 1987 p.357, Barry 1996 passim. Parfit bases his conclusion on Barry.
[379] Gower 1995 pp.51f

One author who believes there is such a way is Jan Narveson. According to him, the overlapping can be used to solve the problem also in the general case. There is always overlapping between generations (since one generation is born by the previous one), and just as one generation takes care of the next one during the latter's childhood, the latter takes care of the former during their old age. Therefore, he claims, it is not really true that the intergenerational relations only work one way.[380]

This could not be a general solution, however, since it cannot deal with situations where the time lap between the act and the effect is so long that there will be no overlapping between the generation that causes the problem and the generation that experiences it. These situations are probably not uncommon when dealing with environmental changes, including changes that cause species to go extinct, which means that Narveson's solution is of limited use for us.

There are also other problems that tell us that Narveson's solution might not even work in the particular case where generations overlap. The relation between generations that Narveson points out does not, in fact, make the relation totally symmetrical. The parent's care of the child takes place before the child's care of the parent. There is thus still a time asymmetry. Time asymmetries always present a problem for theories based on reciprocity since it puts a heavy pressure on the trust of the first agent in the second (potential) agent, and also puts a heavy burden on the sense of duty of the latter to fulfil her part of the deal even though she has already received what she wanted. But basing the argument on this sense of duty would make contractualism superfluous.

There is also another problem: If children are not well taken care of, the effect is in general shown immediately or at least within the lifetime of the parent. This is not always the case when we deal with environmental problems, and when it is the case it tends to make the intergenerational aspect less interesting. If the consequences turn up within the lifetime of the causing generation we do not need to involve duties to future generations in order to establish that there is a moral problem.

There might be a certain degree of interesting overlapping though, since it is possible that the bad consequences begin to show in the later years of the inflicting generation without outweighing the earlier benefits they have already gotten, while the younger generation will have to live with the negative consequences for a long time. In these cases, contractualism would give us a reason to constrain ourselves in our dealings with nature, since the members of the future generation still have time to retaliate if we break the hypothetical contract.

The negative effects often do not turn up until after the inflictors are dead, however, and if they turn up earlier, they might still not overshadow the positive effects until later. This is probably the most common setup in cases of human inflicted extinction. It normally takes a while for a species to disappear completely after a fatal blow, and the disappearance of one species will not

[380] Narveson 1996 p.56

always have any perceptible effect (consider the threshold effects discussed earlier).[381] In these situations, we lack the overlapping that Narveson's argument hinges on.

Another possibility is mentioned by Brenda Almond. She suggests – inspired by Dworkins and Rawls – that justice obliges us to repay future generations for what we got from past generations.[382]

I am not convinced that this can help us solve the problem. How can justice demand that we pay back – not to those we received the benefit from – but to *someone else*?

There is also another serious problem: We live in a world with an increasing greenhouse effect as a result of what our parents and grandparents did. Would that make it all right for us to increase the greenhouse effect further? Are we even obliged to do it and thereby punish future generations for the acts of previous generations in order for justice to be done? Previous generations have driven a large number of species to extinction. This could, if we follow Almond's idea, be a reason or even an obligation for us to do the same.

One could say that we should do to future generations what we *wish* that previous generations *had* done for us, but this cannot be defended from the point of view of rational selfishness. We are back where we started: We need an account of moral standing for future generations that does not depend on what we can actually get from them in terms of benefits or retaliation.

4.1.3. The veil of ignorance

Christian Munthe and Anders Melin are of the same mind as Parfit and Barry when it comes to contractualism in general, but they believe that John Rawls's version is more successful and can actually account for moral duties to future persons.[383]

The persons behind the veil of ignorance do not know to which generation they belong.[384] "They must choose principles the consequences of which they are prepared to live with whatever generation they turn out to belong to."[385] The idea is that they will therefore prefer an equitable distribution of resources between generations as well as within generations.[386]

Initially, this seems plausible given the idea of a veil of ignorance. There are, however, problems that we need to look into. I will start with a problem that

[381] See also Ihse 2005 p.70
[382] Almond 1995 p.18
[383] Melin 2001 p.124, Munthe 1997
[384] Rawls 1973 p.137
[385] Rawls 1973 p.137
[386] Rawls 1973 pp.137, 287f. Commented by e.g. Luper-Foy 1995 pp.95f, 100, Melin 2001 p.124, Munthe 1997. (The "veil of ignorance"-model is described in Rawls 1973 pp.136ff).

I believe is of crucial importance if we are to establish a just distribution of resources between generations. The people in the original position do not know to what generation they will belong, but do they know how many generations the resources are supposed to be distributed among and how large each generation will be? Rawls does not mention anything about this, and to assume such knowledge would be utterly unrealistic. We do not even have this knowledge in the real world. If the people in the original position do not know these things, how can they decide what will be a just distribution? Robin Attfield believes that the impossibility to know is a serious problem for Rawls' theory – especially since the number of generations will partly depend on the decisions of earlier generations.[387]

Luper-Foy believes that the people behind the veil will adopt a policy regarding, for example, consumption and pollution that can be indefinitely sustainable.[388] Such a policy would take care of this problem even though it would be suboptimal for the people behind the veil. It is not optimal since it puts harder restrictions on people than would be necessary if they knew how many generations there would be, but given that they do not know and given that no one would like to be born in generation X+1 after having agreed to base the calculations on X generations, this principle still seems rational given the original position.[389]

Luper-Foy's suggestion would not take care of the problem regarding the number of people per generation. We could, of course, quite simply transform the idea of infinite sustainability into a policy that assumes an infinite number of people. The problem is that such a policy would not allow for any consumption at all. A better solution would be to approach the question of population size from a prescriptive rather than a descriptive angle; that is, the problem could be solved by having the people behind the veil of ignorance adopting a policy for how large a generation is *allowed* to be.

An alternative way to solve both problems would be to assume that everyone that will ever live takes part in the decision behind the veil. This, however, is forbidden by Rawls in his restrictions for the veil of ignorance. He presents different reasons for this restriction. One is that it would stretch our imagination too far. Another (which Rawls himself apparently sees as the strongest) is that the question about who takes the perspective of the original position and when, should not be able to influence the conclusion. Any randomly selected person should be able to go behind the veil and reach the same conclusion.[390] Robin Attfield also points out that the number of future people will depend on the decisions behind the veil. This in turn means that if everyone who

[387] Attfield 1998 p.211
[388] Luper-Foy 1995 pp.95f, 100
[389] It still assumes a rather high aversion towards risk, just like many other decisions Rawls assumes that the people in the original position would take. In Rawls' description of the veil of ignorance he specifies that the people behind it do not know their aversion to risk (Rawls 1973 p.137), but they obviously have such an aversion and it has to be quite strong – much stronger, in fact, than would be granted by the precautionary principle.
[390] Rawls 1973 p.139

will ever live were to take part in the decision behind the veil the number of people behind the veil of ignorance will depend on the decisions behind the veil and we would end up in a paradox.[391]

A possible solution to the problem concerning the number of generations would be to let all generations have their own representatives behind the veil. This alternative is also ruled out by Rawls for the same reasons: It would to demand too much of our imagination to imagine people from different generation conferring behind the veil of ignorance, and it would break the rule that it should not matter for the conclusion who meets behind the veil.[392] It is also excluded by the rule that everyone behind the veil belongs to the same generation. This rule is in fact very problematic. It does not just exclude a simple solution to the problem presented above. In fact, it also threatens to decrease the motivation for the parties behind the veil to consider the interests of future generations at all. The parties in the original position cannot affect the policy of previous generations (who's decisions they cannot change), and they do not have to care about future generations. If they agreed on a principle of inter-generational justice, they would have to start saving for future generations but they would not get anything from previous generations, so their generation would have the worst deal.

Rawls is aware of this.[393] In order to deal with the problem, he initially suggests that the parties in the original position have duties to their immediate descendants, but this solution is dismissed because it does not follow from the conditions in the original position.[394] Instead, he suggests that we see the parties in the original position as representing a continuous time line stretching over at least two generations. This means, according to Rawls, that we have an overlap where everyone will be cared for by someone in the previous generation. Since generations overlap, everyone will be accounted for.[395]

This method of overlapping does not always work, however. Many problems related to extinctions take a longer time than two generations. One generation might cause the extinction but it does not always become a serious problem until two generations later – or more. Maybe it takes that a certain (unknown) number of species disappear for an ecosystem service to stop working. Then the process can be started by generation G but neither generation G nor generation G+1 experience the consequences, and generation G+2 or maybe G+5 is not covered by Rawls method. Even if we assume that the members of generation G+1 represent the future members of generation G+2 in the same way as the members of generation G represent all members of generation G+1, it will not help us since in the case described above, the effects skip one generation and the overlapping is therefore broken. Everyone behind the veil of ignorance belongs to generation G and everyone in generation G+1 is represented by someone in generation G but Generation G+1 will not be affected

[391] Attfield 1998 p.211
[392] Rawls 1973 pp.140, 291f
[393] Rawls 1973 pp.140, 291f, Rawls 1993 pp.273f
[394] Rawls 1973 p.128
[395] Rawls 1973 pp.128f

by the decision. That the people in generation G+1 represent the members of generation G+2 does not help since the no one in generation G+1 will themselves have any say in the original position. It is therefore necessary that the timeline goes on for a longer time than two generations. This in turn obviously presents its own problems. It is a stretch of the imagination already when we talk about two generations and the imagination becomes even more stretched when we talk about a larger number of generations.

There is also a general problem with the solution of one generation representing one or more future generations. It does not tell us anything about how the representative should handle conflicts between her (yet unknown)[396] interests and the interests of those she represents. The situation differs essentially from the intragenerational setting where the reasoning behind the veil takes place. In that setting, the parties are indifferent to each other's interests. In the inter-generational situation the parties are representing the interests of everyone along the same lineage. Rawls does not explain how this representation should be done and thus does not really present any solution to the problem of intergenerational justice.

Another problem is that the solution is not genuinely reciprocal. It is an exception from, rather than a result of, Rawls reciprocal basis, which means that it does not really help us find a *reciprocal* solution to the asymmetry problem. Even though Rawls' theory as a whole is contractual by building on an agreement in an original position, our relation to our descendants will not be contractual if we choose the suggested solution. This means that Rawls' theory is only a contractual solution to the asymmetry problem in a very weak sense – if at all.

It is also a very strong concession by Rawls and means that care for future generations does not follow from the circumstances in the original position but is added in order to save the theory. In his later writings, he therefore chose another solution. Instead of allowing the people behind the veil of ignorance to have emotional bonds towards their descendants, he infers a rule that their agreements must be such that they would want everyone to follow it independently of what generation they belong to.[397] This means that instead of making an exception to the restriction against knowing their interests, Rawls chose to make an exception to the restriction against having any moral inclinations.

I do not know if this is a smaller concession for Rawls. This solution too means that instead of deriving a duty to care for future generations from his theory, he introduces this principle in an ad hoc manner explicitly in order to save the theory. To say that the agreement made by the parties behind the veil must be acceptable also to others that are not present, is in fact a way of saying that we have a moral duty to consider the interest of these people even though we know that we will never turn out to be in their shoes. That is, we have a duty that is assumed and not agreed upon by all those concerned by the agreement. We are

[396] The persons behind the veil are not allowed to know more about their descendants' interests than about their own. Rawls 1973 p.209
[397] Melin 2001 p.125, Rawls 1993 p.274

therefore facing the same objection as before – the solution to the problem of future generations is not genuinely reciprocal and only contractual in the very weak sense of being added to an otherwise contractual theory. The solution itself is not contractual at all.

One could object that Rawls's aim is to find a theory of justice between contemporaries such that everyone would accept it if they take an impartial view. His aim is not to find a reciprocal solution to the asymmetry problem. However, Rawls states explicitly that he considers intergenerational relations a question of justice.[398] In fact, he has to if he wants to be true to his view that questions of justice are something that emerge where there are conflicting interests,[399] as it is quite clear that there are conflicting interests between generations.

It is clearly stated by Rawls that he wants his theory to be genuinely contractual.[400] He also states that reciprocity is the basis for the theory. For example, he says that the idea of reciprocity is implicit in his notion of a well-ordered society,[401] and that the parties in the original position try to advance their good the best they can without being bound by any moral ties to each other.[402]

True, Rawls claims as well that his theory is not an egoistic theory or a theory about what rational egoists would agree upon:[403]

> One feature of justice as fairness is to think of the parties in the initial situation as rational and mutually disinterested. This does not mean that the parties are egoists, that is, individuals with only certain kinds of interests, say in wealth, prestige, and domination. But they are conceived as not taking an interest in one another's interests.[404]

Rawls' definition of egoism seems unconventional. Only to have certain kinds of interests like those mentioned above seems more like shallowness or single-mindedness than egoism. In fact "…not taking an interest in one another's interests" if anything, looks like a very accurate definition of egoism.

There is another way in which Rawls' theory can be said to be non-egoistic.[405] One basic condition for people in the original position is that it should be possible to formulate their principles without reference to proper names or to rigid definite descriptions.[406] This means that it is not possible to agree on principles that are restricted for instance to the generation to which the parties in the original position belong. The point of this principle is obviously to achieve the impartiality that is the very point of the veil of ignorance, and so it can be said to be non-egoistic. But this goes for the system – not for the individuals. In

[398] Rawls 1973 p.137
[399] Rawls 1973 p.129
[400] Rawls 1973 passim. See in particular p.148
[401] Rawls 1973 p.14
[402] Rawls 1973 pp.4, 11, 102f, 128, 142
[403] Rawls 1973 pp.127, 129, 147f
[404] Rawls 1973 p.13
[405] Rawls 1973 pp.132ff
[406] Rawls 1973 p.131

fact, the entire point of Rawls' manoeuvre is to show that it is possible to achieve a non-egoistic system that is acceptable to everyone without assuming that people care about anyone but themselves. Rawls thus makes it absolutely clear that the concept of justice as fairness is supposed to be contractarian in the traditional meaning.

Rawls also stresses that even the most basic principles of justice have to be the result of the choice situation presented by the original position.[407] This includes the so-called "natural duties" such as the duty not to be cruel. These are special in that they do not have to be voluntarily agreed on in the actual world – we are bound by them anyway.[408]

It thus seems quite clear that Rawls' solution to the problem of intergenerational justice *is* a break with his intentions and his basic demands on principles of justice.

The general conclusion is that in spite of Rawls' efforts to find a genuinely contractual theory of justice as fairness that includes intergenerational justice, he has failed to do so since his way of dealing with intergenerational relations is not derived from his original position.

Other contractarians not discussed here have offered different solutions to the asymmetry problem, but none have been able to produce any working solution.[409] I believe that the approaches I have discussed explicitly in this and the previous sub-section are the most promising ones, and since they have failed, I believe we have to conclude that contractualism does not supply us with any rational reason to preserve species for the benefit of future generations.

4.1.4. Communitarianism

Avner de-Shalit tries to solve the asymmetry problem from a communitarian vantage point, which he thinks gives the best account of our duties to future generations.[410] He claims that even though we live at different times we are part of the same community. For example, parts of us survive in the form of our achievements and in the form of other people's memories of us.[411] This is a kind of cultural interaction between the generations: We interact with them by creating and inventing ideas and things that will live on during their lifetimes. They interact with us by upholding the memory of us and by using and refining the things and ideas we have passed on to them.[412] This also goes for ethical

[407] Rawls 1973 p.119
[408] Rawls 1973 pp.114ff
[409] See e.g. David Gauthier (Gauthier 1986 passim). His suggestion is a very clear example of this shortcoming, as is shown in de-Shalit 1990 p.226 and Melin 2001 pp.122ff.
[410] de-Shalit 1995 p.13ff
[411] de-Shalit 1995 p.38f
[412] de-Shalit 1995 p.43

norms. We pass on ethical norms to them. They share, apply, and reflect on the norms.[413] This means that we are part of the same community.

Eventually this will fade off, however. Their reflecting on the common values together with external influences means that after a number of generations we will no longer be members of the same moral community.[414] From this de-Shalit concludes that we do have duties to consider the interests of future generations, but that these duties gradually fade away as we gradually become members of different communities.[415]

This gives us three degrees of duties:

To contemporary people we have far-reaching positive duties.

To those who will live in the near future we have almost as strong positive duties.

To those living further off into the future we have much weaker and only negative duties. Moreover, if it is not a matter of very strong remote future interests competing with very weak present-day interests, the remote future interests will not outweigh the interests of contemporary people.[416]

I find de-Shalit's solution problematic. We are not part of the same community on the same premises. We can pass on norms to them, but they cannot pass on norms to us. No matter how much and how well they reflect on our norms they can still not impose them on us. The asymmetry problem therefore does not disappear.

In addition, it is not obvious to me that sharing the same ethical norms could tell us anything about what the norms should imply. It does not seem to exclude, for instance, that we share the norm that there are no duties to future generations. It is odd to claim that moral standing is decided, not by the content of our ethics, but by whom we share it with. Furthermore, de-Shalit's communitarianism is hit by the argument from marginal cases. Some contemporary human beings are not able to reflect on moral values or fulfil any of the other criteria de-Shalit has placed for being part of the same community. They will therefore fall outside the community and have no standing.

De-Shalit also argues that we want future generations to conclude that our values are good.[417] Why? It is probably not because we fear their reactions. The explanation cannot be that we care for them, since that would beg the question. If we do not care about future generations to begin with, we are not likely to care about what they think about our values.

He refers to the existence of guilt feelings and to our interests in the welfare of future generations as arguments for his idea of a transgenerational community.[418] However, these feelings do not show that we regard future generations as moral objects. It may be that we have these feeling towards them

[413] de-Shalit 1995 pp.45ff. See also Melin 2001 pp.125f
[414] de-Shalit 1995 p.47
[415] de-Shalit 1995 pp.53f
[416] de-Shalit 1995 pp.54f. See also Melin 2001 pp.125f
[417] de-Shalit 1995 p.48
[418] de-Shalit 1995 p.18f

because they are *valuable* to us. We can have an interest in just about anyone and anything from stalagmites to extraterrestrials. If we weaken the criteria for what it takes to be a part of a common community that much, the term would lose all meaning.

It is also a problematic fact that all duties in the transgenerational community are aimed in one direction. De-Shalit uses our upholding of traditions as an argument for claiming that we identify ourselves as being part of a transgenerational community together with past generations of practitioners of the same traditions.[419] If anything, however, this illustrates how interactions between generations move only in one direction. By upholding the traditions of our forefathers, we clearly see that we are influenced by those before us in a way that they can never be influenced by us. De-Shalit talks about a cultural interaction in the form of discussions aiming at finding "a common set of ideas which determine a common good".[420] It is difficult to see how such a discussion can take place between individuals living in different generations, however. Melin also points out that since de-Shalit demands shared values in order to be part of the same community, it must be difficult to perform the kind of critical debate he talks about as something that binds us together.[421]

I have found nothing in de-Shalit's arguments that helps us in our dealings with the asymmetry problem. The general result in this section is that neither communitarianism, nor contractualism can demand from us that we care for future generations. The failure of contractualism also underlines our previous conclusion that rational egoism does not seem to give us much reason for avoiding extinction. Since the asymmetry problem is a problem only for theories that demand some kind of symmetric relation between the moral agent and the moral object however, it is not a devastating drawback to the idea of moral duties to future generations.

4.2. The non-identity problem

One problem that has been widely discussed in relation to future generations, is the so-called *non-identity problem* pointed out by Thomas Schwartz and Derek Parfit among others.

[419] de-Shalit 1995 p.20
[420] de-Shalit 1995 p.25
[421] Melin 2001 pp.127f

4.2.1. How it is handled by Thomas Schwartz

Thomas Schwartz argues that because of this problem, we cannot have moral obligations to posterity other than to our "near posterity".[422] He uses the question of population size to illustrate the problem, but claims that his point can be generalised to cover all kinds of duties to future generations. His reasoning goes as follows: Assume that we do not limit the size of the population and as an effect of that, the lives of future generations of human beings will be less enjoyable. If we take any future person X, it would be very probable that X would not have existed had we adopted a more restrictive population policy. Not only because there would be fewer people, but also because the events leading up to the birth of X would be significantly different. This in turn means that X would probably not be identical to anyone of those who would be born if we were to live according to the stricter policy.[423] The people that would have benefited from the stricter policy will not be the same as those who actually get to live. Therefore, we have not failed to do our duty to those people by not adapting the stricter policy.[424]

He believes that in the first generations after our own, there will still be people who would be identical independently of our choice. We should therefore assume some duties to our immediate posterity. After that, the duties will fade very fast as a result of the exponential increase of differences between the actualised and the non-actualised populations.[425]

This reasoning is then generalised, and Schwartz claims to have shown that it covers all alleged duties to future generations – not just duties concerning population size.[426]

Schwartz is not satisfied with having shown that we do not have any *duties* to make sacrifices on behalf of future generations – other than possibly the immediately following generations. He also claims that to put restrictions on now living human beings in order to benefit future humans cannot even be *morally permissible*, since it would mean that we put restrictions on now living individuals, although there is no one to whom we owe these restrictions.[427]

It could be argued against Schwartz that even though no individual member will be the same under the different policies, the society will be the same. One could therefore object that even if no particular member of the society is better off than she would be had we adopted a more restrictive policy, the *society* would be better off.

This idea differs from the communitarianism discussed in the previous section. Here we are not talking about duties to particular individuals based on

[422] Schwartz 1996 (first published 1978) p.3
[423] Schwartz 1996 pp.4ff
[424] Schwartz 1996 pp.7ff
[425] Schwartz 1996 p.6
[426] Schwartz 1996 pp.10f
[427] Schwartz 1996 pp.11f

their belonging to the same community, but about duties to the communities as such.

One thing that speaks in favour of this approach is that when we talk about future generations, we spontaneously tend to talk about them not as individuals but as a group. Stenmark explains this habit by pointing out that future humans do not yet have an identity, which makes it easier to conceive of them as a group than as individuals.[428]

Schwartz does not believe that referring to the whole society can solve the non-identity problem, however. His argument is that it does not matter morally if the society is better off when no individual is.[429] This objection seems reasonable although not everyone would agree. We do not have to go into that question here, however.[430] We are investigating whether anthropocentrism, can answer the question of why it is morally problematic to cause extinction. Anthropocentrism does not admit moral standing for anyone or anything but human beings. That excludes the possibility of accepting moral duties to societies. This means that we cannot find any help in the idea of moral duties to societies in order to support anthropocentrism even if moral duties to societies would against all odds turn out to be a reasonable position.

Schwartz concludes that we do not have any moral duties to future humans. Instead, he suggests that we presently living humans have a moral duty to *each other* to adopt policies that contribute to a better life for future generations. Most now living human beings wish that future generations will prosper far into the future. In order to secure this wish, we need to make sacrifices. In order to secure a fair distribution of these sacrifices, we all have a moral obligation – not to future generations but to each other – to contribute.[431]

We would, in other words, have no duties *towards* future generations of human beings, but only duties *regarding* them, just as we, according to anthropocentrism, have no duties *towards* other species but might have duties *regarding* them. The difference is that our valuing of a good life for future generations of human beings is probably intrinsic rather than instrumental (although Schwartz does not discuss this question). It is not very probable that people who are unable to affect us would have instrumental value for us.[432]

For our investigation, Schwartz' solution means that we have a duty to other now living human beings to share the burden of considering the well-being of future human beings to which we have no moral duties, but who have intrinsic value for us. This might, among other things, imply a duty to preserve species that have instrumental value for future generations of human beings.

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[428] Stenmark 2000 pp.60f, 64, 67

[429] Schwartz 1996 p.6f

[430] In chapter 6 I will discuss a holistic theory referring not to societies but to species as moral objects.

[431] Schwartz 1996 pp.12f

[432] Anthropocentric instrumentalism the way I have defined it in this investigation does not exclude the possibility that future generations of human beings may have intrinsic value for us. It only excludes that non-human entities can have intrinsic value for us. Schwartz's solution therefore seems to be allowed by anthropocentric instrumentalism. It does not take us all the way, however, since future generations still do not have any moral standing of their own.

4.2.2. How it is handled by Derek Parfit

Derek Parfit's conclusion is radically different. The basic story is the same: If someone had not been conceived at the time she was actually conceived, she would not exist at all. If the conception had taken place earlier or later, it would have involved two other gametes, and therefore the resulting foetus would have a perhaps slightly, but still different, genetic makeup.[433] Parfit sets the time limit at a month (obviously to be on the safe side, but he also hints that the real time interval after or before which we would not have existed had we not been conceived within it, may actually be much shorter).[434]

If we try to benefit a future individual by doing something that will also change the time of "his" conception, we have not benefited him at all – we have benefited someone else who is born instead. This in turn means that if we neglect to take this step, no one is made worse off since he would not have been born at all if we had acted in the less depleting way.[435]

We can complicate the situation further by adding that if we choose different lifestyles, it will also affect whom we meet and have children with, which further strengthens Parfit's point that different lifestyles will lead to different identities of future individuals.

These things taken together mean that if we choose to live a less destructive life, the future people who will benefit from this will not be the same as would be born had we instead chosen a more wasteful lifestyle. If we choose the wasteful lifestyle, it will therefore not be worse for those humans that will actually live in the future as long as their lives will be worth living.[436] If we assume that it is possible to benefit someone by bringing her into existence, we could even claim that we have benefited her by living a wasteful life since if we had not done that, she would not have existed at all.[437]

Should we therefore follow Schwartz and conclude that we have no moral duty – other than a duty to other contemporary humans, and possibly to the immediately following generations – to make any sacrifices for the sake of coming generations? Not according to Parfit. He regards the intuition that we have a moral duty to consider future generations to be a very basic intuition – too basic to give up. He illustrates this by the following imagined situation:

There are two different conditions – K and J – that give the same handicap to the child of a woman who is the bearer of either K or J. The difference between them is that J is curable, while K is not curable but disappears by itself within two months. A programme (let us call it *J*) is set up to cure women with condition J. Another programme (let us call it *K*) is set up to test women for condition K, and if they have it, advice them to wait for two months before getting pregnant. Both programmes will, if performed, have the result that 1000

[433] Parfit 1987 pp.351ff
[434] Parfit 1987 p.352
[435] Parfit 1987 p.358ff
[436] Parfit 1987 p.361ff
[437] Parfit 1987 p.363

more healthy children and 1000 fewer severely handicapped children will be born. Unfortunately, there is not enough funding to go through with both programmes, so one of them has to be cancelled. If we choose to carry out programme *J*, the same children will be born, but they will not suffer from the handicap. If we choose to carry out programme *K,* different children will be born and thereby benefit from the programme. We could therefore say that we have a duty to the would be victims of the handicap caused by condition J to perform programme *J,* but we have no duty to anyone to perform programme *K*.

What do our intuitions tell us? Is there any moral reason to prefer one programme rather than the other? [438] Parfit's intuition is that there is not. If we disregard the obvious fact that there are more risks involved for the prospective mother in having an operation or undergoing medical treatment, compared to just waiting two months before becoming pregnant, I share this intuition. If we do not disregard these things Parfit's point will be even strong because our intuitions tell us to put our money in programme *K*. In any case it seems clearly counterintuitive to claim that we have a duty to go through with programme *J* but not with programme *K*. I suppose most people would agree, in spite of the fact that alternative *K* is vulnerable to the non-identity-problem while alternative *J* is not. The fact that our intuitions do not distinguish between the two programmes indicates, just as Parfit points out, that what matters intuitively in this example is that independently of which programme we choose, 1000 more healthy children and 1000 fewer handicapped children will be born. The identity of the children does not seem to be relevant. [439]

Parfit's conclusion is that we have to stick to the intuition that we have a moral duty to consider the good of future generations. In order to be able to do so, however, he concludes that we have to reject what he calls *the person affecting principle*, that is, the idea that "*what is bad must be bad for someone*". [440]

The idea that what is bad must be bad for someone is also a very basic intuition, however. I would claim that it is more basic than the intuition that we have a moral duty to consider future generations. It is very difficult to make sense of what it would mean for something to be good or bad if it is not good or bad for someone. By this, I mean that for it to be meaningful to call something good or bad, it must in some way relate to a subjective I, that is, to a centre of experience, from which the judgement springs. If there is no centre of experience that judges the event or its effects as bad, it is very difficult to comprehend in what way it could be bad.

I do not believe it is necessary, however, to go as far as to deny that what is bad must be bad for someone, in order to maintain that we have a moral duty to choose the less depleting lifestyle in Parfit's example for the sake of future generations. Parfit himself suggests but dismisses a solution to the non-identity problem based on adopting a wider version of the person affecting principle.

[438] Parfit 1987 p.367f
[439] Parfit 1987 pp.368f
[440] Parfit 1987 p.363

According to this version, something can be worse for people *in the wide total sense* if

> … the total net benefit given to the X-people by the occurrence of X would be less than the total net benefit given to the Y-people by the occurrence of Y.[441]

He also identifies an average version, but dismisses both versions due to their inability to deal with the repugnant conclusion.[442] However, this inability is not due to the wide person affecting principle, but to the basic principles of utilitarianism regarding how to calculate total or average benefit. Since this investigation is not about utilitarianism as such or about problems particularly related to utilitarianism, we do not have to concern ourselves with them here. What is relevant for us is not how to calculate the total or average net benefit. What is relevant is instead that the wide person affecting principle gives us the possibility to use interpersonal comparisons. We can thus keep the notion that what is bad must be bad for someone and still claim that the fact that our way of life affects the welfare of future generations – whoever they will be – gives us a moral duty to adopt a non-depleting lifestyle. This can be done by pointing out that a situation S_1 is (or would be) worse for X than a situation S_2 is (or would be) for Y, meaning that X is (or would be) suffering more or in some other way experience the situation she is (or would be) in as worse than Y experiences (or would experience) the situation she is in (or would be in were it to be realised). In this way we keep the principle that something must be subjectively experienced in order to be valued, but add that it does not have to be subjectively experienced *by the same person* to make a comparison of the experiences. This means that the agent can make a comparison of how different moral objects would experience the different alternatives. Based on that comparison, she could decide which alternative would be experientially worse. It seems, for instance, totally reasonable to say that it is worse for Anna to experience severe torture than it is for David to experience a slight scratch on his arm.

We can thus deal with the terms 'worse' and 'better' by widening the person affecting principle instead of discarding it. We cannot make the same manoeuvre with the terms 'good' and 'bad' since the manoeuvre assumes a comparison. This is not a problem for us, since the non-identity problem is a problem only because we are dealing with two different possible populations under different possible outcomes. If it was just a matter of one population and one outcome, the outcome would be bad if it was bad for the only involved population and the non-identity problem would never occur. We can thus keep the idea that what is bad must be bad for someone. In the same vein we can keep the idea that what is good must be good for someone. It will not affect the question of inter-generational ethics.

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[441] Parfit 1987 p.396

[442] Parfit 1987 pp.396, 398ff. Both the total and the average version run into trouble related to the repugnant conclusion.

Someone might be tempted to protest that by adopting the wider notion that for S_1 to be worse than S_2, S_1 has to be worse for someone than S_2 is for someone (else), we still make an unacceptable sacrifice by giving up the idea that for S_1 to be worse than S_2, S_1 has to be worse than S_2 for one particular person. However, the reason why it was unacceptable to give up the notion that what is bad must be bad for someone, was that it would render 'bad' meaningless if it is not connected to a subjective experience. In the wide person affecting principle the situations are still subjectively experienced and judged to be good to a certain degree or bad to a certain degree. To say that S_1 is worse than S_2 is thus not a *non-subjective* statement but an *inter-subjective* statement.

Nevertheless, is this not bad enough? We are comparing subjective experiences but the result of the comparison is just estimated. It is not experienced by anyone. Nobody is actually experiencing S_1 as worse than S_2.

I do not believe this is a serious problem. An inter-personal comparison is just an inter-personal *comparison* and that is all we need. We do not need an inter-personal *experience* in order to say that one of two possible courses of action would be right and the other would be wrong. I can sympathise with those who feel uncomfortable with using the word 'worse' for describing the result of such a comparison. This can easily be dealt with, however by keeping the comparison and using another – strictly descriptive – terminology. Parfit did not use the word 'worse' in the quotation above, and we do not need to do so either. We can say, for example, that the individuals experiencing S_1 are experiencing a smaller degree of good than those experiencing S_2. The word 'worse' is not necessary for our project. Our aim is not to describe S_1 as being *worse* than S_2 but to say that it is *wrong* to cause S_1 rather than S_2 if we have a choice. Other things being equal, establishing that the individuals experiencing S_1 are experiencing a smaller degree of good than those experiencing S_2, seems to be a sufficient argument for concluding that it would be morally wrong to choose S_1 over S_2 if we can choose differently.

One who does not accept Parfit's solution of giving up the person affecting principle is Jan Narveson. He claims that: "Duties that are not owed to anybody stick in the conceptual throat".[443] The way it is stated, as an attack on the idea of impersonal duties, it is not just a dismissal of Parfit's solution, but also of my suggestion. I believe, however, that the reason why the impersonal duties stick in Narveson's conceptual throat is that when he is uttering them, he is not distinguishing between 'right/wrong' on the one hand and 'good/bad' on the other. If doing one's duty is to do what is right, then it has to be about what is good or bad *for* someone, but it does not has to be expressed as a duty *to* someone. To talk about things as being good or bad without being good or bad for someone would stick in my conceptual throat too. However, this is not the same as talking about duties that are not owed to a particular person. When we discuss the non-identity problem, we are as a matter of fact discussing how we ought morally to behave. It is therefore reasonable that we shift our attention

[443] Narveson 1996 p.43

from what is good/bad or better/worse to what is right/wrong. If we distinguish between good/bad and right/wrong, we will be able to keep the sentence Parfit rejected ("*what is bad must be bad for someone*"), and instead sacrifice the sentence: "*what is wrong must be wrong to someone*". It seems reasonable to say that what is wrong does not have to be expressed in terms of 'wrong to someone'. In fact, it seems intuitively more correct to say about an act that 'it is wrong' than to say 'it is wrong to someone' (or 'it is wronging someone'), even though it concerns what is good or bad for someone. That is, an act can be considered as right or wrong without being right or wrong to someone, but it has to affect (the quality or quantity of) things that are subjectively good or bad for someone even though the identity of the 'someone' is unimportant.

If we apply this to Parfit's example, we could say that choosing a depleting lifestyle would be wrong because it would mean that some people would experience less good than some people would if we choose a less depleting lifestyle, where 'some people' may or may not be the same individuals. The important thing is that we are still talking about things (food, energy, clean air, wellbeing, happiness, fulfilment of preferences or rights, etc.) that are good because they are good for someone, and our behaviour is wrong because it means less of something that is good because it is good for someone (or more of something that is bad because it is bad for someone) independently of the identity of the experiencing individuals. We do not have to infer some kind of objective good that exists independently of a perspective that experiences it as good. We just have to declare the question of identity as irrelevant. We reserve the term 'good' for things that are good for someone, and talk about 'right' when we talk about how we should act.

Parfit's solution has been criticised for excluding non-consequentialistic aspects in ethics.[444] My solution is much less affected by that criticism. The only thing we have to accept in order to avoid the non-identity problem is that it is possible and meaningful to make interpersonal comparisons. We do not have to assume the full load of utilitarianism. We do not, for instance, have to assume any particular way of comparing good or bad. We do not have to accept that we can or should add the good or bad of different people. We do not even have to accept that we are always obliged to make interpersonal comparisons, or that we have to aim for the maximum quote of good over bad in order to accept this solution. The solution ought therefore to be acceptable even for those who have a more deontological view of right and wrong – as long as they accept that interpersonal comparisons are possible, meaningful and at least in situations involving different possible future populations also morally relevant.

The conclusion is that the situation that arises in the future if we chose a more depleting lifestyle today is not *bad* as long as the population will at least have a life worth living (since it in that case is not bad for anyone), but to make this choice would be *wrong* because it results in a situation that is less good for the people affected than the alternative would have been for the people that

[444] Hanser 1990 p.51

would have been affected had we chosen differently – independently of the identity of those affected. Therefore, as long as we do not have a very strong aversion towards interpersonal comparisons, the non-identity problem does not relieve us from having duties to consider the good of future generations – whoever they will be.

4.3. The problem of overwhelming sacrifice

For those who have a utilitarian approach to ethics there is another possible problem to consider. If our aim is to maximise happiness (or well-being or preference satisfaction etc.), we get into a problem if we count and give equal weight to all happiness/suffering or preference satisfaction/preference frustration independently of when it occurs. If we show equal consideration to future generations and avoid messing things up terribly by, for example, destroying essential ecosystem services in the near future or start an atomic war, there will be a multitude of generations ahead of us. This means that almost any sacrifice we can make that will benefit future generations is morally required no matter how small the benefit, since there will be many more who enjoy the benefits than who make the sacrifices.[445] Therefore, it seems that we have a duty to live very modestly indeed, and save almost everything to future generations – and so should the next generation, and the one after that and so on. This in turn means that as long as people can expect there to be several generations ahead of them, every future generation would have to abstain from harvesting what was saved by the previous generation, and just hand it over to the next generation.[446]

This seems like an unreasonably large sacrifice, and it has therefore been suggested that we discount the interests of future generations,[447] or even disregard them totally.

Derek Parfit does not agree with this solution. He claims instead that our problem calls for a general limitation on how great sacrifices someone can be asked to make for someone else – independently of whether we talk about inter- or intragenerational issues. He also thinks that if we believe that trying to maximise the total sum of good leads to inequality between generations and if we find this problematic, we should not solve the problem by discounting but by adopting a principle of fair distribution.[448] If we discount, we may occasionally end up in situations where we could avoid a larger catastrophe in the future by a

[445] Almond 1995 p.6, Melin 2001 pp.128f, Narveson 1996 pp.38,40, Parfit 1987 p.484, Rawls 1973 pp.286f
[446] Narveson 1996 p.59, Whiteside 2006 p.48
[447] Martinez-Alier 1994 p.163, Melin 2001 p.129, Parfit 1987 p.484
[448] Parfit 1987 pp.184f. According to Melin 2001 p.129, others too have reasoned in the same way.

relatively modest sacrifice today but find that it is not worth it since the bad effects in the future carry less weight.[449]

I believe that Parfit is right when he points out that the problem of overwhelming sacrifices is a general problem of distribution and that it is not particularly related to intergenerational matters. We have a similar problem in intragenerational ethics: There is an almost endless amount of poverty in the world, and almost any krona I make would generate a larger benefit if I give it to charity than if I spend it myself. Do I have to give up everything? This is a difficult question for utilitarianism, but no utilitarian would seriously propose that we solve it by not counting, or by discounting, the interests of our contemporaries. If it is not justifiable to use such a method in intragenerational dealings, it cannot reasonably be justifiable when we are dealing with the same problem on an intergenerational level. If we want to claim that it is, we need an independent reason why intergenerational relations are relevantly different from intragenerational relations when it comes to the question of limits to sacrifices. Since the question of overwhelming sacrifices occurs in both inter- and intragenerational affairs it cannot in itself motivate a difference in how we should handle the two situations.

The point is that if we accept the overwhelming sacrifices in intragenerational relations then we have no excuse for not accepting them in intergenerational relations. If we do not accept such large sacrifices then that is a problem for both inter- and intragenerational ethics alike and it has to be dealt with in a way that would work both within and between generations. Discounting does not seem to be considered acceptable within generations and should therefore not be used between generations.

Robin Attfield and Avner de-Shalit point out a tension between intragenerational and intergenerational equity when they argue that it would not be reasonable to demand from those contemporary people who have less than a fair share of resources that they further decrease their use of resources for the benefit of future generations.[450]

In order to deal with this tension de-Shalit suggests a compromise. He suggests that when duties to future generations conflict with "a genuine need to improve the welfare of contemporaries", we should look for what he calls "a middle way".[451]

When our

> … obligations to very remote future generations do not contradict obligations to contemporaries, we have no excuse not to fulfil them. If these obligations to very remote future generations clash with certain obligations to contemporaries, and especially to the worst off among our contemporaries, it is reasonable to argue that in some cases our obligations to contemporaries have some priority (although this

[449] Parfit 1987 pp.184f
[450] Attfield 1998 p.212, de-Shalit 1995 p.11
[451] de-Shalit 1995 p.11

difference by no means cancels out our obligations to very remote future generations).[452]

It is not easy to draw any conclusions from this, however, and it is even harder to find any useful advice on how we should actually behave. Attfield's solution is that we put an upper limit on how large sacrifices one can demand in order for the demands not to be unbearable and therefore ignored.[453]

A simpler solution would be to point out that intergenerational duties are not about one *group* being sacrificed for another. It is about giving equal considerations to the interests of *individuals* whether they live at the same or at different times. It is therefore just as unacceptable to discount the interests of a certain group of contemporaries to favour the interests of other now living or future individuals, as it is to discount the interests of future individuals to favour the interests of now living individuals.

Gregory Kavka suggests that we use Locke's principles of just acquisition, and adapt them to an intergenerational setting. This means that it would be acceptable for us to use resources as long as we do not waste them and as long as there is "enough and as good" left for others.[454] This in turn implies that we should leave the next generation at least as well off regarding resources as we were.[455]

What does it mean to leave enough and as good of a non-renewable resource? One way of doing so could be to limit the number of people, i.e. to limit the number of competitors for resources, in the future, and thereby decreasing the pressure on the resources.[456] That is probably not what Locke had in mind. In addition, for non-renewable resources this would not be enough if we want to uphold Locke's proviso. Even if we use the resources very sparingly, there will be less and less, and sooner or later, it will be totally depleted. Before that happens, there will be less left for each person than each of us living at the moment has used, and therefore Locke's proviso will no longer hold.

One way of dealing with this would be to decrease the number of people in each generation and eventually let the species disappear when the resources are exhausted.

Kavka is opposed to exterminating humanity,[457] but what other alternatives are there? Kavka talks about recycling and using technology to increase the output of resources,[458] but that is probably not enough. Even if we get better at extracting a non-renewable resource, it will disappear eventually and we cannot recycle everything. Some resources are destroyed when we use them. In fact,

[452] de-Shalit 1995 p.11
[453] Attfield 1998 pp.212f
[454] Kavka 1996 p.200
[455] Kavka 1996 p.200 Robert Nozick and Robert Elliot are reasoning along the same lines (Melin 2001 p.130).
[456] Stenmark 2000 pp.53ff
[457] Kavka 1996 pp.192ff
[458] Kavka 1996 pp.200f

even for the resources we can recycle, the second law of thermodynamics will eventually claim its due.

Species are special in that they are in fact renewable up to a certain point. Locke's proviso would therefore allow us to us the individual members of a species as long as there are enough left to secure the future existence of the species. This investigation is, however not about how to use species in a sustainable way but about the problems involved in causing the extinction of species. What we therefore need to ask ourselves is if it is in accordance with Locke's proviso to actually cause the extinction of species. Kavka's suggestion is therefore just not applicable to our question.

An alternative would be to widen the interpretation of Locke's proviso and allow for substitutes.[459] This approach is often advocated by economists (see chapter 2 above), and would be in accordance with, for example, the Brundtland report, which tells us that we may use or even deplete a resource as long as we compensate for the loss.[460]

Let us take fuel as an example. One way of leaving enough fuel to future generations is to see to it that all future generations will have as much fossil fuel at their disposal as we have had at our disposal. However, since we cannot produce fossil fuel, and since it takes nature millions of years to do so, it means that given a stabile population, we will not be allowed to use any fossil fuel at all if we have a duty to leave as much and as good for future generations as we have possessed. However, if we allow for substitutes, we can use all the fossil fuel there is, given that we find an alternative that will do the same job to the same extent and just as well. This modification of Locke's proviso seems more reasonable, and would just take a small amendment. We only need to shift focus from the resource to what we can get from it.

What would this shift mean for our investigation? The answer is that it would reaffirm a suspicion that has been brought up before: That it seems to be acceptable from an anthropocentric instrumental perspective to drive a species to extinction as long as the service or goods we get from it can be substituted by another species or by a non-living source. This means that if we allow for substitution and concentrate our concern on the goods or service rather than on the resource as such, even in an intergenerational setting our theory will be a weaker defence against extinction, and may not be able to entirely account for the intuition we aim to explain.

[459] This alternative is apparently suggested by Elliot and Nozick. See Melin 2001 p.130
[460] World Commission on Environment and Development 1987 p.46. see also Stenmark 2000 pp.56, 62f

4.4. Mental impossibility

It is not easy to *imagine or to reason about* things that will take place very far in to the future. It is probably even more difficult to *mobilise real emotions* towards events that are far into the future even if it is possible to reason around them in an abstract way. This problem has been pointed out by Avner de-Shalit and Jan Narveson among others. According to both of them, it means that we cannot in practice demand from now living humans that they make sacrifices on behalf of future generations that are comparable to the sacrifices we can demand on behalf of their contemporaries.

Avner de-Shalit argues that we should discount the interests of future generations (by not adjudging them with positive duties more than a few generations into the future) because duties that reach too far into the future would demand what is for most people inconceivable.[461]

Narveson claims that a principle that gives future generations the right to an equal share of resources that are basic for life, would be "impossibly abstract or obscure or both".[462] He also claims that this principle will be "self-extinguishing". The reason for that is that we are deciding the size of the next generation. Narveson asks us to consider a scenario where we cut the next generation by half. The question will then be: What does that mean for our resource use? Does it mean that the members of the next generation will be able to enjoy twice as much of the resources, or does it mean that we will be able to spend more of the resources?[463]

Parfit and Melin do not agree with these objections, however. Parfit claims that the fact that future individuals cannot be identified is no more relevant than that we might have difficulties identifying individuals who are geographically far away.[464]

The question is undoubtedly interesting: Do our limited imaginative faculties justify a discounting or even non-counting of the interests of future generations?

Melin points out that to base the answer to whether we should care about future generations on whether presently living people *think* that we should care about future generations is to beg the question that it is the values of now living people that count while the future only counts if *we* think they should count.[465]

Both Melin's and Parfit's objections seem valid, and in addition, one can point out another thing that I believe is crucial. I believe that as long as it is mentally possible to *rationally* understand that even future people will have interests and that the future realisation or frustration of these interests can be affected by what we are doing now, we have a duty to consider this in our

[461] de-Shalit 1995 p.14
[462] Narveson 1996 p.60
[463] Narveson 1996 p.60
[464] Parfit 1987 p.357
[465] Melin 2001 p.11

decisions even if it is a difficult intellectual process and even if it is not possible to fully take in *emotionally*.

4.5. Uncertainty

According to the Brundtland report, sustainable development is a development that "ensures that it meets the needs of the present without compromising the ability of future generations to meet their own needs."[466] To be able to live up to that, we need to know what the needs of future generations are. This looks like a very difficult task. There is a large degree of uncertainty regarding the needs or the interests of future generations,[467] and this problem is also accompanied with some other problems. Avner de-Shalit, for instance, points out that even if it was possible to foresee the interests of future generations (which he does not believe it is) it would be complicated to compare and weigh their interests against the interests of our contemporaries.[468]

Another problem is that we do not know for sure what life will be like in the future, how the technology will develop, or even how long the human species will survive.

This inability to make reliable forecasts not just about the preferences of future generations, but also about the future in general is commented by G. I. Simmons who argues:

> There is time for caution here: if we define justice to include future generations, but cannot forecast the nature of that future at all accurately, then how do we know what to avoid?[469]

Simmons does not want to see this as an excuse for a laissez-fair attitude in relation to future generations, but how do we avoid such an attitude? When we look at the problems presented here, one might be tempted to limit our concerns to the present, and possibly to the immediately following generations while leaving the rest to their destiny. Another approach would be to discount our concern for the future at a rate representing the degree of uncertainty. This last approach is used by many economists and some philosophers.[470] One thing that talks in favour of successive discounting rather than a more abrupt cut-off point,

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[466] World Commission on Environment and Development 1987 p.8

[467] Anderberg 1994 p.110, Farber 2000 p.s495, Stenmark 2000 pp.68ff. Farber, as most philosophers, talks about 'interests' rather than 'needs'. Since neither term is exactly defined it is difficult to pinpoint where they differ other than that 'interests' is probably a wider term than 'needs'. In order to follow the standard philosophical terminology I will use the term interests.

[468] de-Shalit 1995 p.5, Melin 2001 p.128

[469] Simmons 1995 p.71

[470] See Gower 1995 p.57, Kavka 1996 pp.190,202 note 8, Martinez-Alier 1994 p.164, Parfit 1987 p.481

is that we are dealing with predictions that tend to get more uncertain the further into the future we stretch them. Discounting would make it possible to lessen our concern successively in proportion to the increasing uncertainty.

Another possibility is put forward by Jan Narveson who suggests that our almost total lack of knowledge of the future can be seen as an argument for confining our concern for the future to approximately the next 50 years.[471] His argument is that since we are next to totally ignorant, "no rational consideration of the problem is possible …".[472]

One might point out here that if "no rational consideration of the problem is possible" how can he then conclude that confining our concerns to 50 years is better than any other solution? I think Narveson is too pessimistic, however. In the previous chapter we noted that inertia is not always the best way of handling uncertainty. We found that in situations where for instance important values are at stake, it is more rational to take precautionary measures such as demanding extra high degrees of certainty in order to go through with a project that might threaten the value in question. If we have a situation where our decision may threaten important future interests although we do not know if they will, the conclusion must be the opposite of what Narveson recommends. I.e. in order to be justified to ignore future generations, we should demand a high degree of *certainty* that future generations will *not* be harmed by the project in question. Lack of knowledge should count *against* ignoring them, not the other way around. The degree of certainty we demand should of course as argued earlier stand in proportion to how important we suspect the interest to be. This is complicated since that is one of the things we do not know. This too seems to talk in favour of being extra careful with what we subject them to.

Parfit is in general negative to discounting the interests of future generations, and he makes no exception when it comes to discounting because of uncertainty. He follows the same strategy as before and points out that we have to distinguish between (1) the fact that our predictions get less certain over time, and (2) whether, given the assumption that a prediction is correct, we are entitled to discount the weight of the effect just because it takes place in the distant future. He admits that (1) is often the case, but does not believe that this can answer (2).[473]

According to Parfit, this is important for two reasons: Both because we should be careful not to "miss-state our moral view", and because there are situations when predictions do *not* get less certain over time.[474]

I agree with the first reason: We should be more cautious about the terminology we use and not claim that we discount on the basis of time as such when we are actually discounting on the basis of diminishing certainty. Never the less, if we clearly state that we discount because of diminishing certainty and our prognoses as a matter of fact do get less certain over time, the result will still, in

[471] Narveson 1996 p.40f
[472] Narveson 1996 p.41
[473] Parfit 1987 p.481f
[474] Parfit 1987 p.482,486

practice, be that the interests of future generations will get less attention further into the future.

How about Parfit's second reason? Even if he is correct and there actually are such cases, we still have to admit that most prognoses *do* get less certain over time. That there are a few instances when prognoses do not get more uncertain over time shows us that uncertainty is not always a good reason for discounting the future, but maybe the reliability of our prognoses declines with time often enough for discounting a good general rule? If that is the case, duties to future generations might in general not be a good basis for claiming that it is immoral to contribute to the extinction of species.

On the other hand, it might be that the few things we can predict with a higher degree of certainty are important enough to make a difference even if the uncertainty is great in the general case. Several authors point out cases where our knowledge about future generations is not so bad.[475] Kavka, for example, points out that we do know that future generations will need "enough food to eat, air to breathe, space to move in, and fuel to run machines".[476] Fenner in turn states that we can know that future people will need air and water, etc. but we cannot know anything about their aesthetic preferences.[477] Rolston goes a step further and argues that we cannot doubt that they will need "water, soil, rain, photosynthesis, or enjoy sunsets, mountains, seashores – or bird watching",[478] and that some resources like water, air etc cannot be substituted – which means that contrary to oil, for example, we can be sure that future generations will need them.[479]

I believe that Fenner is more correct than Rolston regarding the uncertainty of the preferences of future humans, but the statement that all three agree upon, viz. that there are certain basic things that future generations will need to the same extent as we do seems very plausible. The question is: What does this tell us? Even if we agree that they will need fuel for their machines, we do not know what kind of fuel. While I write this, a large variety of alternatives are being developed, and I would not like to bet much money on which of these will be the fuel of the future. Maybe a combination? Maybe something completely different that no one has yet thought of? Our need for things like food, air and water on the other hand is biologically determined and we can assume that these things will not change substantially in the future. All life forms on the planet need water and nutrients, and all "higher" life forms need oxygen. This may not seem like much information to base our concern on, but for this investigation it is very central. These interests are very basic and they are directly related to some of the ways in which we have already found that other species are most important to us. In order to have food, a working water cycle, sufficient levels of oxygen, suitable climate, etc. we need working ecosystems and we need other species. This means that the

[475] See e.g. Attfield 1998 pp.211,213, Fenner 2006 p.334, Kavka 1996 p.189, Melin 2001 p.129, Munthe 1997, Rolston 1988 p.278, Rolston 1994 p.232, Stenmark 2000 p.69
[476] Kavka 1996 p.189
[477] Fenner 2006 p.334
[478] Rolston 1994 p.232
[479] Rolston 1988 p.278

few things we do know about the needs of future generations are still very important for our investigation.

The conclusion seems to be that we are not justified in using the lack of certainty concerning future generations as an excuse for discounting their interests concerning other species. We only have some knowledge about a few things but these things are on the other hand very important – and directly relevant for our investigation since they imply that species that have a high instrumental value for us will also have a high instrumental value for future generations of human beings. When it comes to the things we do not know, it seems most reasonable to invoke the precautionary principle. We do not know whether a particular species will be important for future generations, but we have a strong suspicion based on historical evidence that many species will turn out to be important for future generations – probably in ways we cannot yet imagine.[480] We should therefore be very restrictive when it comes to doing things that risk leading to extinction, and the burden of proof should lay on the shoulders of those in favour of exploitation.

4.6. Democracy

A possible argument for discounting is that most people living today seem to be less concerned with the further future compared to the immediate future. We could claim that we, for democratic reasons, have to respect this and discount the future.[481]

However, Parfit points out that this argument only exhorts us to follow the majority view concerning whether we should discount the future. It does not tell us what this view morally ought to be – and this is the question we are concerned about.[482] I agree with Parfit that there is a distinction and that it is relevant. Since we are performing a moral investigation, the relevant question is whether it is right to count the interests of future generations for less than the interests of contemporary people. This question cannot be answered by an election.

There is also another problem with the argument from democracy. It begs the question of whose interests should be considered. A basic assumption of the argument is that most *now living people* are less concerned with the further future. If we base our decision solely on the concerns of now living people, we have excluded the interests of future generations already in the decision process.

It is in fact a serious problem for present versions of democracy that they seem incapable of dealing with this kind of questions: They are not democratic over time. We do many things today that have been decided by "democratic"

[480] Gärdenfors 2005 p.119
[481] Parfit 1987 p.480
[482] Parfit 1987 p.480

methods by now living human beings, but most of the people who will be affected by the decisions are not represented in the decision process simply because they are not yet born.[483] Since the normal democratic process is inherently biased in favour of the present population, we cannot rely on the normal democratic process in intergenerational issues. If we want a reason to exclude the interests of future generations, it has to be an independent argument why their interests should not count. It cannot be based on a process where future generations are already excluded in the process.

4.7. Loss of opportunity value

A common reason for discounting the future is based on the issue of opportunity loss. A thing that (like money) represents an instrumental value has value because of what you can get out of it (in the form of end value or of another instrumental value – like more money). The earlier you get something, the more utility you can extract from it. If you get it later, you will not be able to use it while you wait, and you will therefore lose opportunities.[484] This is an important reason for economic discounting, but is it applicable to the question of whether and to what extent we should consider the interests of future generations?

Alan Randall does not think so. He points out that market economy has a tendency to handle questions of resource use over time as investment problems, but he is not convinced that this is a useful approach in situations like extinction that has effects for a very long time and are irreversible.[485]

Parfit points out in the same way as he has done with the other arguments for discounting, that it is important to keep in mind the reason for discounting. If we think it reasonable to discount for opportunity losses, we should be clear that it really is a matter of opportunity discounting, not temporal discounting as such. Parfit stresses the importance of being clear about this both in order for us not to be led astray in our moral reasoning and because he does not believe that opportunities always decrease over time. For instance, some investments do not bring any return, and things we consume do not decrease in opportunity value if we receive them later (we can only consume them once anyway). Furthermore, when we deal with trade-off-situations, we will continue to get value out of what we started with until we trade it in. This will compensate for the value we should have extracted from the thing we are going to trade it for. Assume that we are going to exploit a beautiful landscape in order to build an airport, but the exploitation is delayed. We will then lose opportunity value because we cannot

[483] Anderberg 1994 pp.73, 264ff, World Commission on Environment and Development 1987 p.8
[484] Martinez-Alier 1994 p.164, Parfit 1987 pp.482f, Rolston 1988 p.277, Whiteside 2006 p.47
[485] Randall 1986 pp.83, 96

use the airport but we will also gain opportunity value because the landscape will be intact and can be used for other things like recreation.[486]

Parfit's way of reasoning seems reasonable up to a certain degree, and I think he is right in pointing it out since it is often forgotten in real life decisions. We have to admit, however, that if we find the trade-off worth doing in the first place, i.e. if we value the airport higher than the unspoiled landscape, we have presumably decided that there is more value in the airport than in the unspoiled landscape. We will therefore lose net opportunity value by delaying the exploitation even if we can get some value from the unspoiled landscape while we wait.

What does this mean for our investigation regarding intergenerational ethics? Let us assume that building the airport in the example above will lead to the extinction of a species that has its last refuge in the area. Let us also assume that the species supplies some kind of good but that the airport will be more valuable for us than the species. Let us finally assume that by the time the last contemporary human has died, the airport has become obsolete but that the species would have continued to produce the good had it been allowed to survive. That would mean that even though its value for us is smaller than the value for the airport, its value for future generations will be larger than that of the airport. These are the assumptions. The reason for the last assumption is to create an intergenerational conflict. The question would then be: What alternative would give the largest amount of opportunity value?

An aspect that seems to be important when we apply the question of opportunity value on intergenerational relations is that the receivers of the value will change during the process. If we build the airport, *we* will receive a higher opportunity value. Future generations will not get anything and since they will not have the species either, they will lose out on the deal. It therefore looks like discounting on the basis of opportunity value assumes that future generations do not have any moral standing or at least a lower moral standing.[487] There might be another explanation, however. It may be that we do count future generations but realise that we will get more out of the airport if we build it than they would get from the species. I.e. we will win more than they will lose. In that case, we do not have to assume that future generations are without moral status in order to get the result that it is better, all things considered, to build the airport. In fact, we have not even reached the conclusion that the interests of future generations do not count. We have considered their interests but concluded that it will be more in our interest to drive the species to extinction than it is in their interest that we preserve it. That way, opportunity value is not really a basis for discounting the interests of future generations, but in practice it will, at least in some cases, still make references to the interests of future generations less useful for those who claim that we should protect species for anthropocentric instrumental reasons.

The reasoning above presupposes a strictly utilitarian outlook. It might, however, be that we hold a moral conviction about what counts as a just

[486] Parfit 1987 p.483f

[487] This seems to be Munthe's conclusion (Munthe 1997).

distribution of harms and benefits between moral objects, or any type of principle with the effect that there are limits to what we can subject a moral object to in order to benefit someone else. Then we cannot dismiss the fact that we will get the benefits of the higher opportunity value while future generations will not get anything, as easily as we did above. I.e. we cannot get rid of the problem that we get all the benefits from the airport and they get none of the benefits (since they have no use for the airport and the species is gone), by referring to the fact (when it is a fact) that the total sum of good will be larger that way.

In cases like this, it therefore seems that a deontological approach would mean larger consideration of future generations, and also a stronger reason to avoid extinction.

Even from a utilitarian perspective, however, we have to remember that it is not necessarily always the case that the total value will be higher from decisions like the one above. Not even the opportunity value would always be higher that way, and even when it is higher, it can in many cases be outweighed by a higher total value over time if we utilise the species in a sustainable way. The important point here is, however, that there will probably be some cases where a utilitarian anthropocentric instrumental approach – even if we accept moral standing for future generations – will accept that we drive a species to extinction even when the moral intuition we are investigating in this book tells us that it would be wrong. I do not know how often this will happen in reality, but it still weakens the position for anthropocentric instrumentalism in our investigation.

4.8. Distance

Parfit is very careful to point out that we should not claim to be discounting because of time when our reason for discounting is, in fact, something else. In this sub-section, we shall ask whether it is reasonable to discount because of the distance as such between the decision-maker and the affected person. We can imagine different kinds of distance. One type is temporal distance. Another is genetic distance (distance of kinship).

Parfit claims that discounting because of kinship is not strictly the same as discounting because of temporal distance though in practice they always coincide since the degree of kinship decreases from generation to generation.[488]

However, temporal discounting may well play a role of its own independently of kinship or other forms of distance discounting. If one believes that the distance between the agent and the object is important for moral considerations, why should genetic distance be more important than temporal distance? I guess we should rather say that temporal discounting is a sub-

[488] Parfit 1987 p.485

category of distance discounting just like genetic discounting (or kinship discounting) is. Even if these two sub-categories in general coincide, they do not always coincide and have to be handled separately.

The most interesting question is whether any form of discounting for distance is morally acceptable (or even obliged).

Parfit compares time discounting and spatial discounting. He claims that no one accepts spatial discounting, and believes that temporal discounting is equally unacceptable.[489] Gregory Kavka and Jan Narveson reason along the same lines. Narveson argues that the fact that people differ by their location on the planet does not grant that we should treat them differently and the same should apply to future people who differ from us when it comes to their location in time. The same rules that guide our dealings with contemporary people should thus apply to our dealings with future generations just as the same principles apply to all presently living people, even though some live quite far from us in geographical terms.[490] Kavka in turn notes that spatial location is not morally relevant, so why should location in time be?[491] He also considers it part of rational prudence to put equal weight on one's own present and future, and thinks that analogously rational morality should put equal weight on present and future generations.[492] Mary Warren makes an analogy with different kinds of non-acceptable discrimination forms of now living people. She claims that "the historical period in which they exist" is no more relevant as a basis for moral standing than are other "accidental properties" such as age, race or sex.[493] Shrader-Frechette makes the same analogy with irrelevant properties but from a contractual perspective.[494] Sumner points out that to favour someone just because of her location in time is to count someone for more than one, which cannot be acceptable according to utilitarianism.[495] Kavka's comparison with rational prudence does not seem relevant here since in his example we are talking about one and the same person, not about our duties to consider other people's interests. The other arguments seem valid, however. Not least the comparison between geographic distance discounting and temporal distance discounting. If we are not allowed to discriminate because of spatial distance as such, we should not be allowed to discriminate because of temporal distance as such, and I cannot think of any relevant difference between the two cases that would make it acceptable to treat the cases differently.

How about kinship distance then? Can we apply the same reasoning there? Intuitively, it does not seem unreasonable to treat one's own family different than others, at least in some respects. I believe very few people would find it immoral if someone feeds her own children rather than sending food to distant children if we have to choose between the two options. In fact, many people are inclined to

[489] Parfit 1987 p.486
[490] Narveson 1996 p.39
[491] Kavka 1996 p.188
[492] Kavka 1996 p.188
[493] Warren 1996 p.29
[494] Shrader-Frechette 2000 p.772
[495] Sumner 1996 p.103

find it morally questionable *not* to take special care of their own family. This does not seem to be a matter of strict proportional discounting, however, and it apparently does not apply to all situations. Even if it is morally required to give certain benefits to your closest kin or to give priority to your closest kin in some situations, you may not do so generally and you are not allowed to harm others in order to benefit your closest kin, at least not if the harm done exceeds a certain magnitude. Parfit suggests that the kinship discounting in analogy with spatial discounting (which he now surprisingly seems to accept) should not apply to inflicting of great harm. I.e., even if it is acceptable to give larger benefits to your closer kin, this way of reasoning is not acceptable when we talk about large degrees of harm. To cause great harm to anyone is never acceptable, according to Parfit, independently of how distantly related the victim is.[496] This statement obviously needs to be more specified since we need to establish how much harm we are talking about. It might also have to be widened since it is not always acceptable to give larger benefits to your closer kin either. Parfit's solution does seem to be generally acceptable, however.

Another thing we have to add, which is also pointed out by Parfit, is that the discounting should probably only apply up to a certain distance.[497] Even if it is reasonable to treat your own child differently than a much more distantly related child, it is not acceptable to treat that child differently than an even further related child. Discounting is therefore reasonable only up to a point. The alternative would be a discounting that decreases exponentially with decreasing degree of kinship. This alternative could be made to coincide closely with the exponentially decreasing degree of genetic kinship.

Our conclusion is that discounting based on distance might be reasonable when it comes to kinship distance, but only up to a certain point and only in some situations, and never when we are talking about great harm. No discounting is acceptable on the basis of temporal distance as such.

4.9. Will they need our sacrifices?

Another thing to consider is that although many natural resources decrease and are eventually depleted, other types of good actually increase. Knowledge, for example, is typically increasing. With the help of knowledge, we can find substitutes for some of the depleted resources. We also invent new technologies that utilise other (and possibly less) resources compared to the old technologies.[498] This means that we could compensate for at least some of the

[496] Parfit 1987 p.486
[497] Parfit 1987 pp.485f
[498] Hermele 1995 pp.21, 105, World Commission on Environment and Development 1987 p.45, Whiteside 2006 p.47. These authors differ in how optimistic they are on this point. None of them are

demise we have caused by accumulating knowledge and improving science and technology that benefits the lives of future generations.[499] Since we constantly create new knowledge and since knowledge can be transferred from the present to the future but not the other way around, it is highly probable that future people will have more knowledge than we do. That way, they may figure out remedies to the problems we have already caused.[500] It is even claimed that the increase of human knowledge might be more important than natural resources for the economy.[501]

This is sometimes seen as an argument not to restrict ourselves for the sake of future generations,[502] or at least to discount the future negative effects of our actions. Parfit identifies two principles that support this reasoning:

1. Diminishing marginal utility. They will be better off than we are. Because of that, a certain resource or other benefit would be relatively less important for them than for us. It is therefore reasonable that we use the resource instead of saving it for future generations.

2. Distributive justice. If they will be better off than we are, we cannot be morally required to redistribute our more limited resources to benefit them.[503]

By now, we know Parfit's position. First, to discount because of (1) and (2) is not the same as discounting for temporal reasons and we should be careful to state the correct reason for our discounting. Second, the overlapping is probably not perfect. In this case, because some future humans are likely to be less well equipped than some present day humans.[504]

An interesting problem with (1) as an argument against making sacrifices is pointed out by Avner de-Shalit. Thanks to technological progress, the resources we leave to future generations may well be worth more to them than to us.[505] This means that from a utilitarian perspective, the accumulation of knowledge and improvement of technology can be an argument *in favour of* preservation.

Another author who is not satisfied with the appeal to knowledge accumulation is Shrader-Frechette. She is not explicitly talking about species extinction, but attacks the assumption that future generations might be better equipped to deal with nuclear waste than we are.[506] Her arguments could also be useful in a discussion about species extinctions however.

She launches four arguments:

The first one resembles Parfit's second objection above: We cannot know that future generations will be better equipped than we are to deal with a certain problem. She mentions that things like overpopulation and depletion of resources

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convinced that these abilities can totally compensate for the losses we have caused. Hermele seems to consider the most optimistic estimates to be quite naïve.

[499] Callicott 1999 p.371, Hermele 1995 p.106, Narveson 1996 pp.39f, Rawls p.288, de-Shalit 1995 p.2

[500] Narveson 1996 pp.40, 57, 59

[501] Radetzki 1990 pp.48, 51, Radetzki 2001s.72

[502] Narveson 1996 p.60, Rawls 1973 p.287

[503] Parfit 1987 p.484. Also pointed out (though less explicitly) by Martinez-Alier 1994 p.4

[504] Parfit 1987 p.484

[505] de-Shalit 1995 pp.4f

[506] Shrader-Frechette 2000 p.773

as well as the possibility that the problem as such gets worse over time, may actually make it *harder* for them to deal with the problem.

Secondly, she invokes an argument from justice: Even though another person is better equipped to deal with a problem than I am, I have no right to expose this person to the problem.

Her third argument is that the appeal to increasing knowledge is self-serving by being clearly in the interest of those who make the decision.

The fourth argument says that we are dealing with a case of misplaced priorities. She argues that it is more important to protect someone from harm than to promote welfare and if a person is harmed, she cannot be compensated by enhancing the welfare of *someone else*.[507]

Let us take a look at these arguments: In her first argument, Shrader-Frechette questions the assumption. I find it very difficult to assess the probability of the assumption in the long term. So far the accumulated knowledge of humanity has increased tremendously and seems to increase exponentially. As a result, our technological capacity has skyrocketed (not just literally). If this continues, there seems to be almost no limit to what future humans may be capable of. Not everyone is convinced that this will be enough, however. Luper-Foy, for instance, is rather pessimistic about the possibility of solving the problems we have caused by improved technology. He claims, for example, that there is not much room for improvement of the food production.[508] I am not sure that he is right on that particular point. The same thing has been claimed before and they have been proved wrong. We have to remember, however, that the assumption that the capacity of future generations to solve all problems we may throw at them is based on simple extrapolation and we ought to be careful about what we impose on posterity with reference to such an unsophisticated forecasting method. There have been periods of stagnation in the history of human thought. During the middle ages, the Catholic Church put a very strong lid on human thinking, which in effect meant that intellectual progress in many areas was made virtually impossible for a long time. We cannot be totally sure that this will not happen again, even though it seems unlikely. Had, for instance, Nazi-Germany been victorious in World War II, we might have ended up in a situation where new thinking would have been impossible in many areas and old knowledge would have ended up in the flames. We can also imagine that catastrophes like atomic war or extensive climate change (or indeed serious depletion of biodiversity) may be at least as effective lids on human progress in the future. The very behaviour we are trying to defend by the argument from increasing knowledge may eventually undermine the argument by prohibiting the progress. It might therefore be a good idea to apply the precautionary principle again. Since we do not know what capacities future generations will hold, and since large values are at stake, we should not use this uncertainty as an excuse for not taking the necessary measures to avoid imposing the problems on them.

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[507] Shrader-Frechette 2000 p.773

[508] Luper-Foy 1995 p.99

Let us now have a look at Shrader-Frechette's second objection: It does indeed seem unacceptable in intragenerational relations to go around and cause problems for other people and excuse oneself by pointing out that they have the ability to handle the problems we throw at them. It is one thing that someone is capable of dealing with a problem. It is another to say that it is acceptable to expose him to the problem (whether I too have this capacity or not) – at least as long as it actually *is* a problem. If future generations were to have such powers that problems that seem overwhelming to us are not even problems to them, then maybe it would be justified to say that we have done nothing wrong by exposing them to these "problems" simply because they would not be problems.

What, then, if they are still problems but so insignificant that future generations will be able to deal with them in a few seconds by a simple and cheap operation, or that their society or technology will be so different from ours that they would be able to live with the "problems" with only a small inconvenience? Then I suppose we would be justified in saying that what we did was a little selfish, but not that bad. What if the problem would take a little more effort to solve or make their lives somewhat more inconvenient? Then one should probably say that what we did was not very nice, but no serious crime. So we could go on. My point here is that we are dealing with a matter of degree. The question is: Where should we draw the line?

A utilitarian will clearly draw the line where the total expense for future generations will be larger than the gain for us. From a deontological perspective, this is not acceptable. According to Shrader-Frechette, it is intuitively obvious that we have to consider basic rights before we try to maximise the total welfare.[509] Thereby we have slid into her fourth objection. I will not enter the debate of deontological versus consequentialist ethics here. I will just note that if we assume a deontological position, our answer would not so much depend on how much we can gain from imposing this problem on future generations. Instead, we would have to accept that imposing problems on future generations for our own gain is not a just behaviour even if the problems we cause are relatively small. Exactly where the limit should be placed is, however, a question that remains to be answered.

Let us turn to the third objection: The fact that a decision favours the decision-maker is not in itself an argument against it. Considering what our experience tells us about human beings, however, we must be aware of the risk of bias. This is a reason for some degree of healthy suspicion. When dealing with future generations we also have to take into account the fact that we, for obvious reasons, cannot mitigate the risk by letting them take part in the decision.

The fourth objection is in fact two: That it goes against the principle that harm is more important than benefit, and that it goes against the principle that it is wrong to let one person pay for someone else's benefit even if the benefit is larger than the harm.

[509] Shrader-Frechette 2000 p.773

I have already discussed both these intuitions. The second one is discussed above and the first one is discussed in section 3.3.1 where we concluded that it was in need of better justification before we dare to accept it and we therefore do not want to rely on it in this investigation.

The conclusion from this sub-section must be that the accumulation of knowledge is very large and it is reasonable to assume that it will increase the capacities of future generations to deal with problems that seem overwhelming to us, but that we cannot straight off take this as a valid excuse for downplaying our responsibilities. There are still moral problems with imposing the costs of our progress on future generations even if they can handle it. We have also seen that there are uncertainties regarding the future development – especially since our acts might seriously change this development, and that the accumulation of knowledge may even in some cases be an argument in favour of preservation.

4.10. Conclusions

For anthropocentric instrumentalism, it is important to show that we have moral duties to consider the interests of future generations. In this chapter, we have seen that there are many difficulties, but that it is quite reasonable to assume that we have such duties as long as we do not adhere to a contractarian or communitarian approach to ethics, and as long as we accept interpersonal comparisons. We have also found some reasons to restrict our duties to future generations in certain situations, e.g. by discounting, which weakens the power of anthropocentric instrumentalism somewhat. On the whole it seems, however, that the duties we have to consider the interests of future generations give us relatively strong moral reasons not to contribute to the extinction of other species.

We have to add, however, that if duties to future generations of human beings is a good reason to consider extinction a moral problem, a non-anthropocentric view that also accepts duties to future generations of *non-human* life, would give us an even stronger reason to condemn acts that contribute to the extinction of species.

5. Something is lacking

Alan Randall tells us that: "The earth's biota may be viewed as a resource or a complex group of resources."[510] The question is, may it *exclusively* be viewed as a resource or a complex group of resources – or are there other types of value that have to be considered in order to answer the question of what is wrong with extinction? Maybe it is problematic in itself to regard other species just as resources? We have, up to now, assumed an anthropocentric instrumental vantage point in order to test what obligations anthropocentric instrumentalism place upon us regarding other species. As philosophers, we cannot stop there, however. We must also ask whether there is something in our moral intuitions that cannot be captured by the view of the earth's biota as a resource or as a complex group of resources, even if this view supplies us with strong reasons for preservation of the biota. Let us illustrate this with an analogy:

Imagine a meeting in the southern part of USA some time during the first half of the nineteenth century. A group of slave owners has gathered to discuss some disturbing rumours about the slave trade. These rumours say that the slave ships are coming in less and less frequently. Presumably because the slave traders have to travel further and further inland on the African continent to find new slaves. There are even worries that if they continue to harvest slaves at the same pace, Africa will soon run out of humans suitable for slavery. At the same time, the cotton harvests have been larger than ever, so the economy is going great. As a result, the slaves who have done the harvesting are completely worn out. Many have become sick or permanently crippled. Some have even died, and "to be honest", one of the slave owners admits, "we have mistreated our slaves". "In fact", he continues, "some of us do have a tendency to use the whip a little too much. Not that the slaves didn't deserve it, but we have noticed that the slaves that have been too severely punished have had trouble working after a while. So maybe we should try to treat our slaves a little more wisely? After all, the slave system has worked well for us and we want it to work well even for our children and grandchildren, and we should definitely develop this system so that more white people can have their own plantations and prosper economically. In short, we need a more sustainable development of the slave trade!"

For a present day observer, it is immediately obvious what is wrong with this picture. The slave owners regard the slaves as merely resources for them to use, and instead of abolishing a genuinely immoral system, they are looking for methods to prolong it.

There are obviously many differences between the picture above and the problems we are dealing with in this investigation, but I trust the reader does not let the main point of the analogy get lost among the differences: The slave owners in the story did not really care for the slaves. They just cared for the work they could do, and the reason for lessening the pressure on the slaves was exclusively about productivity. In the same way, according to anthropocentric

[510] Randall 1986 p.79

instrumentalism, other species should be preserved not out of concern for the species or their individual members, but only out of concern for ourselves and future generations of human beings.

What this story shows is that a full account of why it is morally problematic to contribute to the extinction of other species possibly involves more than instrumental values for human beings. Even if that value is enough to establish that something is wrong, it may not give the whole moral picture.

Even so, could we not just play along and appeal to the instrumental value of the species for tactical reasons? When we started our investigation of anthropocentric instrumentalism as an answer to our main question, we noted that this answer has a dominating position in national and international policy documents. Could we not use that fact in order to get the protection we want even if it is not (totally) for the right reasons? It is not uncommon to hear phrases with that purport from active environmentalists, but there are risks connected with this strategy. One risk is that by using this tactic we will get *what we ask for*, but not *what we want*. It happens now and then that environmentalists and environmental groups seemingly successfully use anthropocentric instrumentalist arguments to back up their claims but when they finally get what they asked for they are still not happy. The government, city council or company they have been negotiating with cannot understand why the environmentalists are still complaining since they got what they asked for. Sometimes even the environmentalists themselves have difficulties explaining what is wrong. They may disagree among themselves about why, but they at least agree that something is wrong. The problem might be that the environmentalists want to preserve an area or a species because they see some kind of value in it that exceeds the human resource value, while what they got (and what they probably argued for) is a law (/policy/agreement/etc.) that preserves the species in order to use it more efficiently by the human society.

Very often, it seems that a species is preserved only as a way of producing new individuals that can be utilised. For many, this is counter to their moral intuitions, and it seems that even if this way of handling nature is rather prudent, there is something wrong with it. Many would say, like in the example with the slave owner convention above, that it is something morally wrong.

J. Baird Callicott makes an analogy with space travellers who find life on another planet, and after having established that it is life, they eradicate it. Intuitively, there seems to be something wrong about this – something morally wrong. Callicott claims that this would be more wrong compared to if they had eradicated some interesting geological patterns.[511] Apparently, this extraterrestrial life form does not have any greater resource value for us so why is it still wrong?

[511] Callicott 1986 p.142

6. Ecocentrism

An alternative way of accounting for the intuition that we are doing something morally wrong when we cause other species to go extinct is presented by the moral theory that goes by the name *ecocentrism*. Ecocentrism claims that we have moral duties to the species as such. It also claims that we have moral duties to other wholes such as ecosystems, but for the purpose of this investigation I will limit the discussion to the question of species. The idea is that species are holistic systems with intrinsic value that endow us with moral duties to the species directly. The species have this status among other things because they have morally relevant interests. All species have interests of their own in virtue of being species. These interests are independent of our interests in the species, and they are not reducible to, or a function of, the interests of individual organisms.[512]

This theory stands in sharp contrast to anthropocentric instrumentalism that claims that we have moral duties *regarding* species in virtue of our interests in them. It also stands in equally sharp contrast to the wider version of individualism that we will investigate later, that claims that we have moral duties to *individual members* of different species. According to ecocentrism, we have duties to species and ecosystems in a way that is not reducible to and not a function of duties to individuals.[513] This means that we cannot account for these duties by considering, for example, the interests of the majority of the individual members of the species. When ecocentrists talk about something as being *good for a species*, they do not mean the same thing as, for example, Paul W. Taylor does when he says that the good of a community or a population consists of

> … the population or community maintaining itself from generation to generation as a coherent system of genetically related organisms whose *average good* is at an optimum level for the given environment.[514]

Where 'average good' means that

> … the degree of realization of the good of *individual organisms* in the population or community is, on average, greater than would be the case under any other ecological functioning order of interrelations among those species populations in the given system.[515]

According to Taylor's view, the good of a species is a function of the good of the individual members of the species. According to ecocentrism on the other

[512] Callicott 1987:2 pp.196f, Johnson 1991 p.156, passim, Rolston 1988 pp.146f
[513] See e.g. Callicott 1999 p.67, Johnson 1991 p.156, passim, Rolston 1988 pp.137,141. Thomas Anderberg (Anderberg 1994 p.133) refers to Rolston's theory as 'collectivism' ('kollektivism' in Swedish). This is clearly mistaken.
[514] Taylor 1981 p.199. My italics.
[515] Taylor 1981 p.199. My italics.

hand, it is actually possible that the good of a species in some circumstances can go against the good of every individual member of the species.[516] In these cases, ecocentrism often (but not always) assigns a higher priority to the interests of the species or the ecosystems, than to the interests of the individuals.

The ecocentric belief that species have interests that are not reducible to, or a function of, individual interests also means that the ecocentrists believe that some problems in environmental ethics (like the one we are investigating) cannot be accounted for, or dealt with, by using individualistic moral theories.[517] Instead, they claim that duties to species and ecosystems as such, is the only way of fully accounting for our moral concerns regarding species extinction.

There are different versions of ecocentrism, and the versions differ in many ways. The position outlined above is, however, something they all share, and it is also directly relevant for our investigation. I will therefore limit my discussion to these particular aspects of ecocentrism.

Since ecocentrism aims directly at the species, it looks like ecocentrism would be the most suitable theory for our purpose,[518] given of course that it is a feasible theory. The talk about duties *to* species looks like something that could cause problems already on account of something we have already discussed: As we found in sub-section 4.1.2, talking about duties *to* someone would, if we mean it literally, fall victim to the non-identity problem. I therefore suggested that we instead talk about duties *to consider the interest of someone*. As we saw above, the purpose of the ecocentric claim that we have duties to species is to deny that species are morally relevant *only* to the extent that they occur in the interests of individuals, and instead affirm that the species have interests of their own that we have a duty to consider. I therefore believe that the ecocentric use of the phrase 'duties to species' can be reformulated along the lines I have suggested without losing any of its meaning, and that it therefore does not fall victim to the non-identity problem. The main tenet of ecocentrism will thus be that we have a moral duty to consider the interests of species.

There are several other problems connected with ecocentrism, however, and many writers on the subject are very sceptical to ecocentrism.[519] In this chapter will take a look at two of the most important problems in order to figure out whether they are real problems, and if so, if they can be remedied.

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[516] Rolston 1988 p.147
[517] Callicott 1986 p.144, Westra 1997 passim
[518] See Leitzell 1986 p.247 who points out precisely this but also emphasizes the problems of defending the theory.
[519] See e.g. Norton 1986:2 p.275, Regan, Tom 1983 p.359

6.1. What is a species?

The ontological status of species is rather unclear. It is sometimes claimed that the species concept is just something we have invented to aid our thinking and talking about nature, and that species do not have any independent existence outside of our brains.[520] It is, for example, suggested that our division of nature into species might be an evolutionary adaptation of our thinking that has resulted from our practical needs to identify the plants and animals we interact with.[521]

The problems do not stop there, however. Even if species do exist outside of our minds, in what sense do they exist? Are they individuals in some meaning, or are they classes or natural kinds? Are they discrete entities or is the transition between species only a matter of degree or even just a matter of convenience?

Independently of why we want to preserve species, it is important to have some idea of what a species is. The ontological status of species is, however, much more important for the ecocentric approach than for the others. If we find it important to preserve species for anthropocentric reasons, it is important to know what different life forms contribute with for us humans. The properties of the species are important but their ontological status is not particularly important. It does not matter very much where we draw the lines between different species as long as we manage to preserve enough organisms with features that are important for us. If we concentrate our concern not just on humans, but on a wider selection of individual organisms the ontological status of species is, even less important. What is relevant then, is the moral status of the individuals. The question of what species they happen to belong to is only interesting in so far that it tells us something of their needs. The ontological status of species is not relevant at all.

If we instead claim, as the ecocentrists do, that the species as such are moral objects, then the ontological status is crucial. To begin with, it is very difficult to maintain that we have moral duties to species if they have no existence independently of our imagination. It is difficult to imagine what it would mean for something that does not exist, and will not exist, to have interests that make moral demands on us.

Even if species do exist independently of us, the problems are not over for the ecocentrist. *How* they exist is also important. It is not much easier to imagine a class as having morally relevant interests than to imagine the same of a construction of our fantasy, even if classes have an objective existence. If species are just conveniently cut out stretches of a continuum of related organisms, it is also problematic to claim that we have duties to a particular stretch.

Holmes Rolston III, who is one of the most prominent advocates for ecocentrism, does not believe that the problems involved in finding one universal species concept is a threat to his theory, or that it matters too much which species concept we use. He acknowledges, however, that it is necessary for his theory

[520] Atran 1999 p.231, Donoghue 1985 p.172, Ereshefsky 1999 p.295, Rojas 1992 p.171, Rossello-Mora 2003 p.323, Sober 1993 p.143, Thompson 1990 p.154
[521] Atran 1999 p.231

that species have an objective existence.[522] He also admits that there are problems in saying what a species is, and that some see species as just a convenient way of grouping individuals,[523] and he does admit that this is a problem for his approach:

> Nobody doubts that the individual bear exists, but if the various species are only the arbitrary groupings of biologists, one can seriously doubt whether there is a duty to endangered species.[524]

Rolston and the other ecocentrists I have investigated argue of course that species do exist independently of us. They are not alone, however. Many other philosophers as well as biologists claim the same thing. On the other hand, there are as we saw above also a host of philosophers and biologists who dispute such claims.[525]

Since I, contrary to Rolston, suspect that both the choice of species concept and the ontological status of species are relevant for his theory, and for ecocentrism in general, I will investigate both these questions. Considering that the species concepts tell us what criteria are used to divide organisms into species, it is reasonable to assume that different species concepts present different problems and possibilities for ecocentrism.

What species concept we chose has direct bearing on the question of species ontology. I will therefore start with the species concepts, and then go on from there to the ontologies.

6.1.1. "A plethora of species concepts"

As the headline indicates, there is a large selection of different species concepts.[526] David L. Hull from whom I have borrowed the headline of this sub-section talks about a *plethora*, or a *myriad* of definitions of species.[527] We have, for example, the morphological species concept, the biological, the phenetic, the ecological, the evolutionary, the evolutionary significant, the typological, the genetic, the phylogenetic, the polythetic, the cladistic, the genotypic cluster, the cohesion, the isolation, the recognition, the reproductive competition, the composite, the autamorphic, the nominalistic, the internodal, the genealogical,

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[522] Rolston 1988 pp.135f
[523] Rolston 1999 p.123
[524] Rolston 1999 p.123. See also Rolston 1988 pp.133ff were he expresses the same worry.
[525] See the following discussion for examples.
[526] Ereshefsky talks about a dozen species concepts (Ereshefsky 1999) p.29, while Griffiths estimates the number of species concepts to about 20 (Griffiths 1999 p.222). and Rossello-Mora mentions 22 (Rossello-Mora 2003 p.323) and 24 (Rossello-Mora 2003 p.324).
[527] Hull 1999 pp.34, 37. Hull is not alone of this terminology. Also Mishler (Mishler 1999 p.307), and Bock (Bock 2004 p.188) talk about a plethora of species concepts.

the successional, the taxonomic and the Hennigian species concepts, etc.[528] These can in turn be divided into different versions and grouped into different types.

Henry K. Svenson groups the different concepts into three categories: Resemblance among the organisms, phylogenetic ancestry, and arbitrary grouping depending on whom you ask.[529] David L. Hull has grouped the species concepts along a different axis. He distinguishes between interbreeding, ecologic, and phylogenetic species concepts.[530] He has also attempted a bipolar classification: One group based on structural similarities and the other on phylogenetic relationship. These two groups can in turn be divided into several subgroups.[531] John Dupré talks about three categories of species concepts: Morphological, evolutionary and pluralistic.[532] Robert Wilson and Marc Ereshefsky divide the species concepts into two groups along the same lines. Wilson uses the terms 'genealogical' and 'reproductive', while Ereshefsky calls them 'phylogenetic' and 'interbreeding'. The distinction is the same, however. The genealogical/phylogenetic species concepts are based on genetic descent while the reproductive/interbreeding species concepts are based on reproductive isolation.[533]

The question of how to classify species is usually called "the species question". In 1953, Svenson claimed that there was, at that time, no answer to the species question.[534] Reydon claimed the same thing more than 50 years later.[535] Between those years, the number of species concepts has not decreased. Instead it has increased, and is still increasing.[536] The same goes for the number of arguments for and against the suggested concepts. It thus seems that we are no closer to a definite answer to the species question today than we were in 1953. If anything, we might even be further away.[537]

Historically, when people have divided organisms into groups, they have been mostly concerned with the most salient properties of the organisms.[538] The properties could be of different kinds. E.g. the way the organisms look (big, small, fury, four-legged, two-legged, etc.), the way they behave (swimming, crawling, running, hunting, grazing, burrowing, etc.), in what environment they live (the forest, the field, the mountains, the sea, in the wild or on a farm, etc.), and not least, what useful or dangerous properties they have from an anthropocentric instrumental perspective. Some of the classifications are quite well in phase with modern classifications, but not all of them. Whales are, for example, not classified as fish by any of the modern species concepts even

[528] Bock 2004 pp.178,180, Ereshefsky 1999 p.291, Ghiselin 1974 p.542, Gibbons 1996 p.1501, de Queiroz 1999 p.78, Reydon 2005 p.142, Rojas 1992 p.171, Sokal 1973 p.361
[529] Svenson 1953 p.56
[530] Hull 1999 p.37
[531] Hull 1999 p.34
[532] Dupré 1993 p.44
[533] Ereshefsky 1999 pp.290f, Wilson, Robert A. 1999:1 p.191
[534] Svenson 1953 p.56
[535] Reydon 2004 pp.300f, Reydon 2005 p.155
[536] Mishler 1999 p.307, Reydon 2005 p.141
[537] Rojas 1992 p.171
[538] Dupré 1993 p.44

though they swim, are equipped with fins and live in the sea. The modern species concepts often coincide with each other in practice, though they never completely overlap.[539] For our purpose, the degree of overlap in practice is not of primary importance, however. In order to figure out whether species can be moral objects, it is the theoretical basis for the taxonomy that is important.

Some claim that only one species concept can be correct (monism), while others claim that we need different species concepts depending on what aspects of living nature we want to talk about or study (pluralism).

If we take a monistic approach, we have to choose one concept as the correct one. I will look at three of the most discussed concepts and briefly present the most notable advantages and disadvantages of these species concepts, in particular from an ecocentric perspective. After that I will do the same with pluralism.

6.1.2. The phenetic species concept

The first species concept I will have a look at is the so-called *phenetic species concept*. As with most of the species concepts, it comes in different versions. What all versions of this concept have in common is that they group organisms into species based on their overall similarity in terms of morphological and/or genotypic properties.[540] It is thus the modern species concept that most closely resembles the more traditional way of conceiving of species depicted above. It is also the easiest one to apply and is therefore often the method used in practice by field biologists to distinguish between species.[541] Even so, it is rarely used for *defining* species. It is not particularly popular as a species concept (as opposed to a rule of thumb) among biologists or philosophers of biology today.

One problem with the phenetic species concept is that you need to study a large sample of a population to find useful and relevant morphological gaps.[542] This means that it is relatively easy to apply to organisms that we have much experience of, but it is rather difficult to apply to new found life forms. It is also considered too uninformative from a scientific point of view. The overlap between phenetics and evolutionary history is, for example, not good enough for the phenetic species concept to be useful when it comes to identifying relevant units in evolutionary biology. It is also a problem to decide what kind of and how much similarity should be enough to form a species. The problem of finding good demarcation lines is, however, a problem that is not unique for the phenetic

[539] Ereshefsky 1999 pp.291ff, Sokal 1973 p.362, Reydon 2005 p.152
[540] de Queiroz 1999 p.55, Sober 1993 pp.158, 163, 167, Sokal 1973 p.361, Wilson, Robert A. 1999:1 p.190
[541] Sober 1993 p.157
[542] Sokal 1973 p.362

species concept, and we will look at that problem separately at the end of this section.

Another problem is that it is difficult both I theory and in practice to make sense of the idea of an overall similarity. What does it mean that two organisms have a greater overall similarity then two other organisms, and how do we in practice weigh and combine the different characters of each organism into a total picture that can be compared between organisms?[543]

From an anthropocentric perspective, the phenetics species concept has the advantage that it informs us of to which degree different species possess different useful properties or properties that convey end value to the species. The drawback is that it is not very informative when it comes to how the species fit in the evolutionary context or how they interact within or between groups. This is information that is useful even from an anthropocentric perspective, both because it helps us assess the role of the species in question as suppliers of ecosystem services, and because it helps us determine how best to preserve the species.

From an ecocentric perspective, the phenetic species concept is more problematic, however. One problem is that if we base our criteria on the overall similarities, it is not clear how species are special in relation to any other taxa.[544] By that I mean that it does not explain why species are assumed to have interests but not sub-species or genus.

None of the ecocentrists I have looked at explicitly endorse the phenetic species concept, but it seems to be crucial for one of the main arguments presented by Holmes Rolston III. He argues that there is such a thing as an objectively and clearly observable good state for everything in nature – "a good of its kind" – that is supposed to explain how we can identify interests in species and non-sentient organisms.[545] This good state is apparently signified by the properties of the members of the species. Rolston says, for example, that "… as soon as one knows what a blue spruce is, one knows what a good blue spruce is."[546] If we would accept a species concept that is not based on the properties of the individual members of the species, but on properties of the population (like genetic descent or reproductive isolation) this kind of manoeuvre would not be possible. The "good of its kind"-argument therefore seems to presuppose a phenetic species concept. On the other hand, if we do accept a species concept that is based on the properties of the individual members of the species, it will be difficult to claim that the species as such have interests that are not reducible to interests of its member organisms.

That *we* decide which properties are relevant and what degree of similarity is enough for a group of organisms to form a species according to the phenetic species concept, also makes it very difficult to make sense of the idea that the interests of the species are independent of our interests.

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[543] Sober 1993 pp.167f
[544] Sober 1993 p.158
[545] Rolston 1988 pp.101ff
[546] Rolston 1988 p.101

The conclusion seems to be that even though there is large overlapping of the groups we get by applying the phenetic species concept and the groups that ecocentrists want to preserve, phenetic species do not look like good candidates for being moral objects.

6.1.3. The biological species concept

The species concept that has been the most popular during the second half of the previous century is the so-called *biological species concept* (there are also different versions of this concept).[547] It is together with, for instance, the recognition and the reproductive competition concepts an example of the interbreeding approach to species concepts.[548] It tells us that what makes up a species is the gene flow between its members, and what distinguishes a species from other species is the lack of gene flow between them. Species are therefore according to this species concept identified as interbreeding populations. An interbreeding population in turn is a group of individuals that together can produce viable offspring.[549] The basic idea is that the interbreeding makes the population evolve together as a unit.[550] The fact that there are populations of organisms that are reproductively isolated from each other is explained by the evolutionary forces. Geographic isolation makes a sub-population evolve in a different direction from other sub-populations and maintain the properties that are useful in their environment. When the members of the different populations become more different, genetically, physiologically and in terms of behaviour, individuals from different populations will be less likely to mate even if they meet, and if they do mate, the probability that it will result in a viable offspring will be smaller. The latter means in turn that selection will favour individuals that are less interested in mating with members of the other population, and the isolation will become permanent.[551] For short: What starts out as a contingent external geographical barrier evolves into a permanent intrinsic reproductive barrier. We can therefore say that the biological species concept is based on how evolution creates isolated and objectively distinguishable groups.

This looks like a reasonable way of dividing organisms into species. It also carries some information that is useful when studying evolutionary biology. There are problems with the biological species concept, however, and it has started to lose its popularity in recent years.[552] One problem is that it is difficult

[547] Mishler 1999 p.307, Sokal 1973 p.361
[548] Ereshefsky 1999 pp.290f
[549] Bock 2004 p.180, Ereshefsky 1997 p.502, Gibbons 1996 p.1501, Sokal 1973 p.361
[550] Ereshefsky 1999 p.287
[551] Dupré 1993 p.46, Sterelny 1999 p.121
[552] Donoghue 1985 p. 173, Dupré 1999 p.9

to use in practical taxonomy. Both biologists and palaeontologists often use morphological features to decide the species of an organism even if they try to place the specimens into the biological species concept. This is in particular the case with palaeontology where we are dealing with fossils, where it is impossible to know whether two organisms were actually interbreeding.[553] Walter J. Bock believes that this is just a problem for practical identification and not for the theoretical definition.[554] I am not sure, however, that it is entirely unproblematic to use one set of criteria for practical identification and another for species definition. The correlation between the two criteria will probably never be perfect which means that when biologists make observations of what they identify as a species and then draw conclusions based on these observations, the entities they observe will not be exactly the same as the entities to which they confer their findings. It also ought to be problematic from an ecocentric perspective that the entities pointed out by their theory will not be exactly the same entities as will be protected in practice.

There are also degrees of interbreeding, which means that the borders between species can be quite arbitrary.[555] The problem of drawing the line between species is, as we saw above, something that it shares with the phenetic species concept – and in fact with all other species concepts. I will therefore come back to this problem in a later sub-section.

The problem that has gotten the most attention is also a problem that is both salient and quite serious: The biological species concept is based on reproductive barriers, which means that it is not applicable to life forms that do not reproduce sexually.[556]

A simple way of dealing with this problem is to just deny that asexual organisms form species at all. This way out has also been used by some of the proponents of the biological species concept.[557] It is not a very satisfying solution, however. It is both counter-intuitive and impractical, and most biologists do not accept it.[558] From the ecocentric perspective it would also mean that a large part of biodiversity would be left out of their system, which is clearly contrary to their intentions.

One might attempt to make the biological species concept applicable to asexual species by, for example, stating that a population of asexual organisms constitutes a species if it is sufficiently isolated in other respects (geographically, physiologically, genetically) that its members *would have* been reproductively isolated had they been able to reproduce sexually.[559]

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[553] Bock 2004 pp.178, 182, McAlester 1962 pp.1378,1381, Masters & Spencer 1989 p.273, Sokal 1973 pp.361, 363

[554] Bock 2004 pp.182, 185

[555] Sokal 1973 p.363

[556] Bock 2004 pp.178, 181, 184, Dupré 1993 p.46, Dupré 1999 pp.6f, Ereshefsky 1999 pp.293f, 303 note 2, Hull 1999 p.39, McAlester 1962 p.1377, Sokal 1973 p.363, Sterelny 1999 pp.121f

[557] Dupré 1993 pp.51,271 note10, Dupré 1999 p.7, Ereshefsky 1999 p.293, Masters & Spencer 1989 p.277, de Queiroz 1999 p.55, Sober 1993 p.155, Sokal 1973 p.363, Wilson, Bradley E. 1995 p.344

[558] Ereshefsky 1991 p.90

[559] Griffiths presents a suggestion along these lines (Griffiths 1999 p.210).

However, I suspect that few biologists or philosophers would be satisfied with this type solution. The solution is clearly ad hoc and counterfactual. It is also a step away from one of the main motives behind the biological species concept by allowing species that are not bound together and isolated from other groups by gene flow. For ecocentrism it is unsatisfying to identify their object of moral concern as a group of individuals that *would* have been an interbreeding population *if* they reproduced sexually. It is just very difficult to understand how this could generate non-reducible and morally relevant interests. It is also generally unsatisfying to base something as important as moral status on a purely hypothetical consideration.

Another general problem with the biological species concept is that there is, in fact, a gene flow over the accepted species boundaries.[560] For instance, what is conceived of as different oak species, have a tendency to share genes quite frivolously. That they are still conceived of as different species suggests that total reproductive isolation is not necessary for us to talk about different species.[561] This is in particular a problem for the idea of genetic isolation, which, as we saw, is central to the biological species concept.[562]

Sober does not believe that this is a problem. He believes the biological species concept can accept that species hybridize, and he makes an analogy with Siamese twins and with nations whose territories overlap. In both these cases, there is an area that belongs to both Siamese twins or to both nations but this does not mean that we cannot still distinguish between the nations or persons in question.[563] The obvious weakness in this defence is that in these two cases we can and do use other criteria than bodily or geographical isolation to define the individual person or the individual nation. It is much more difficult to deal with the problem of gene flow between populations for a theory that uses genetic isolation as the definition of individual species.

We also have the opposite problem: The gene flow *within* species (e.g. between different local populations of what is conceived to be the same species) is sometimes relatively small, but in spite of that, the populations do not always evolve any inherent reproductive barriers and therefore continue to count as one species. The common muzzle (Mytilus edulis) is but one example of this. It exists in isolated populations in different parts of the world. They are genetically very different but they still count as one species.[564]

In some cases, populations are strictly geographically isolated, which means that there is *no* gene flow between the populations, and in spite of that, they continue to count as one species.[565]

What stops us then from just re-classifying these species and count each sub-population as different species even though the barriers are just geographic,

[560] Donoghue 1985 p.175, Dupré 1993 p46, Sokal 1973 p.363, Sterelny 1999 pp.121f
[561] Dupré 1999 pp.7,9, Ereshefsky 1999 pp 288f, Sterelny 1999 p.121
[562] Dupré 1993 p.46, Dupré 1999 pp.7f
[563] Sober 1993 p.156
[564] Johannesson 2005 p.176
[565] Bock 2004 p.184, Donoghue 1985 pp.174f, Dupré 1999 pp.8f, Ereshefsky 1991 pp.90,92

not physiologic or genetic? This solution has been promoted by, for example, Elliot Sober and Kim Sterelny.[566] Sterelny thinks that the demand for intrinsic barriers is puzzling since the consensus view of the biological species concept is that it is the relation between organisms, not their intrinsic properties, that define species.[567]

One problem with this solution pointed out by Sterelny himself, is that extrinsic barriers in some cases are only temporary.[568] This means that accepting geographical barriers as species boundaries could at times lead to the strange situation that a species splits into two and then merge back into one species. Both Bock and Sober accepts that this can happen. Bock does not seem to find this at all problematic,[569] while Sober speculates that the cases where populations are geographically isolated without evolving internal reproductive barriers only exist during so short times that they do not matter.[570]

Another reason for why many are dissatisfied with external barriers as borders between species is that it is seen as too counterintuitive. There will be an inflation in the number of species, and the resulting species do not fit with how biologists or the public conceive of species. This in turn also means that they might not coincide very well with the groups that ecocentrists (or people in general) feel morally obligated to preserve.

Counting external barriers as sufficient for distinguishing between two species also raises some other difficult questions. Do, for instance, two individual organisms who live at different, non-overlapping, times belong to the same species? Time seems to be an absolute external barrier. In order to get around this problem we could limit our criteria to only consider geographical, not temporal external barriers. This solution would work for this particular problem but it seems quite ad hoc. Why should geographic barriers be more important than temporal barriers? Walter J. Bock goes the opposite way. Instead of trying to get around it, he simply accepts that only organisms living at the same time belong to the same species.[571] Species can, according to this idea, not be compared over time. To ask if two populations living at different times belong to the same species is, according to Bock, a "non-question".[572] This sounds rather odd and not very fruitful. Assume, for instance, that we have three generations of organisms where generation G_1 overlaps with generation G_2 and generation G_2 overlaps with generation G_3 but generations G_1 and G_3 do not overlap. Then the organisms belonging to G_1 and G_2 would be of the same species and so would organisms belonging to G_2 and G_3, but the question of whether organisms of generations G_1 and G_3 belong to the same species would be a "non-question". It would also cause serious problems for palaeontology since it would be

[566] Sober 1993 p.155, Sterelny 1999 p.133
[567] Sterelny 1999 p.130
[568] Sterelny 1999 p.130
[569] Bock 2004 p.181
[570] Sober 1993 p.156
[571] Bock 2004 p.179
[572] Bock 2004 pp.179, 185

impossible to ask whether two fossils from different eras represent the same species.

Another problem with relying on external barriers is that it will be impossible to identify museum specimens if we do not know where they come from.[573] This is particularly problematic considering the habit of appointing "type specimens" as representing species. Sterelny dismisses this particular worry as a leftover from an outdated system,[574] and I am inclined to agree. Contrary to Sterelny, however,[575] I believe that the general problem of not being able to tell which species a specimen belongs to without knowing where it is collected seems like a reductio ad absurdum-argument against the suggestion that external barriers are sufficient. This argument can be augmented if we also consider not just specimens in museums, but also living individuals in botanical or zoological gardens. We would have to know where they came from in order to identify the species. It gets even worse if we are dealing with individuals that are born in a zoo.[576] Individual animals that are born in different zoos and kept isolated would count as different species even if they would have belonged to the same species had they been born in the same zoo or in the wild. In fact, every group of organisms or even single organisms isolated behind a fence or in a cage in e.g. a zoo would make up its own species. We would also have to stop claiming that individual animals born in a zoo represent species existing in the wild.

All of this seems quite counterintuitive and it would pose an interesting question for the ecocentrists: Do we actually have an obligation to isolate as many organisms as we can in order to create more species – or at least try to keep already geographically isolated populations that do not have an internal reproductive barrier between them isolated in order to save these species from merging into one species? Ecocentrism does not demand that we create new species or that we protect species from going extinct from "natural" causes, but it does demand that we do not actively contribute to extinction. An interpretation of the biological species concept that accepts external barriers as sufficient would thus imply that we, according to ecocentrism, would have a moral obligation to avoid destroying non-intrinsic barriers between populations. From an anthropocentric perspective this would only follow if the populations have different properties that are important to us, and that would be lost if the populations were to merge. From an ecocentric perspective, we would always have such an obligation. Is this in accordance with the basic ideas of ecocentrism? It seems that this is not something the proponents of ecocentrism have considered. If they accept this version of the biological species concept, it is apparently something they will have to consider. In particular, they would have to deal with the seemingly absurd consequence that even though we have no

[573] Sterelny 1999 p.130
[574] Sterelny 1999 p.136 note 9
[575] Sterelny 1999 pp.130, 136
[576] This problem may not even presuppose that the individuals are born in the zoo. If we accept that individuals can change species just by becoming geographically isolated, the problem would occur even if we capture and isolate an animal or a group or animals. I doubt that this idea would have many adherents however.

obligation to create new species by isolating populations, once we have created them (e.g. by isolating them in a zoo) they would, according to ecocentrism, have their own morally relevant interests. So by just isolating sub-populations we could create new interest bearers. This would make the ecocentric notion of 'interest' even more difficult to comprehend. It also confronts the ecocentrists with the following question: Do we have a moral duty to protect these new species once we have created them? Do we, for instance, have a duty not to exchange genetic material between zoos as is often done in order to prevent inbreeding? If we do not have such a duty, then why not? If species have morally relevant interests qua species, and the miniature populations in zoos are species, then reasonably they must have morally relevant interests too. If we do have such a duty, we will have to protect every miniature population in every zoo. This goes expressively against the ecocentric tenet that preserving species in zoos does not count as an acceptable form of preservation. To let them out would also go against ecocentric principles. In fact, letting them out would be equivalent to exterminating the species since it would mean that we take away the isolation mechanism and they would cease to be a species. Letting them out would thus mean automatic extinction of the species even if the individuals survive – which in itself seems very counterintuitive. The most theoretically interesting question is of course: How can the production of external barriers between populations create new interests?

It is, in fact, quite common that the species we get even with the standard notion of the biological species concept (that demands *intrinsic* reproductive barriers between species) diverge from how biologists and the public would like to distinguish between different species.[577] It would also, in many cases, give us a classification that would not be the most informative. The co-variation between interbreeding groups and morphological or evolutionary groups is not as good as was once thought.[578] This in turn is a serious problem for those who want to promote the biological species concept as the universal species concept, since it shows that there are some relevant and informative groupings that cannot be achieved by the biological species concept.[579]

Donohue even concludes that the biological species concept creates confusion by assuming that there is a correlation between interbreeding on one hand, and morphological and ecological distinction on the other hand, even though there is no causal relation,[580] which in turn will make it harder to understand the causes of evolutionary change.[581]

From an ecocentric point of view, the counter-intuitiveness ought to be quite problematic since it means that the species and therefore the moral objects will not totally coincide with the units they want to preserve. An advantage with the biological species concept is that it clearly points out the species taxa as the

[577] Dupré 1999 p.9
[578] Donoghue 1985 pp.173ff
[579] Dupré 1999 pp.7, 9
[580] Donoghue 1985 p.173
[581] Donoghue 1985 p.175

only real taxonomic level.[582] Other taxonomic levels like sub-species, genera, etc. can be seen as conventions, but reproductive isolation produces (according to the theory) objectively distinguishable groups.[583] This is an advantage from an ecocentric perspective since it is important for them both that species have an objective existence and that species can be justifiably seen as relevantly different from the other taxonomic levels – which we, according to ecocentrism, do not have any duties to.

The most difficult problem presented to the ecocentrists by the biological species concept is essentially the same as with the phenetic species concept: How do they connect the general idea of species as interbreeding populations with their idea of species as moral objects with a non-reducible, independent and morally relevant interest in continued existence? How do gene flow and reproductive isolation generate this kind of interests? I suspect that finding such a connection will be quite a challenging task for the ecocentrists.

This, together with the other problems we have found, means that we have to conclude that the biological species concept might be at least as problematic as the phenetic species concept from an ecocentric point of view.

6.1.4. The phylogenetic species concept

A competitor to the two species concepts we have just investigated is the *phylogenetic species concept*. Contrary to the biological, the phylogenetic species concept has increased in popularity.[584] Like the previous two concepts we have discussed, this concept too comes in different versions.[585] The basic idea that all versions of this concept have in common is that species are made up by organisms who share the same ancestor. This is usually depicted in the form of segments of a phylogenetic tree.[586] There are more or less strict versions of the phylogenetic species concept. According to the most common version, only monophyletic groups qualify as species.[587] This means that two branches on the evolutionary tree can only belong to the same species if there is no other branch between them that is not a part of the species.

The big question is where to divide the segments.[588] Why do we cut the segments at one particular level and not at another? Lineages can be more or less inclusive. Lineages can also include other lineages where both lineages are monophyletic and both the included and the including lineage are equally

[582] Sober 1993 p.158
[583] Bock 2004 p.179
[584] Dupré 1993 p.270 note 2, Dupré 1999 p.9
[585] Dupré 1999 p.9, de Queiroz 1999 p.78
[586] Dupré 1993 p.48, Dupré 1999 p.9, Ereshefsky 1999 p.291 Sterelny 1999 p.122
[587] Donoghue 1985 p.178, Dupré 1993 p.48, Horvath 1997 p.228
[588] Donoghue 1985 p.179, Sterelny 1999 p.122

cohesive and integrated. The phylogenetic species concept cannot point out one level as more important than others.[589] Why, for instance, do two brothers not make up a species? They share a common ancestor that they do not share with their cousins. We can also ask: why do all primates not count as a species? We clearly have a common ancestor some millions of years down the evolutionary tree and there is no other evolutionary linage between us. Indeed, it seems that the phylogenetic species concept could accept everything from individual organisms to the whole biosphere as species. It thus seems that the problem of drawing the line between species that we have seen in both the phenetic and the biological species concepts is also present in the phylogenetic species concept. The only difference is that the problems in this case are along the vertical plane as well as the horizontal.

It is mainly the different ways of answering the question of where to draw the line that divides phylogenetics into different versions. One simple way of cutting the segments of the phylogenetic tree into species is to count all distinguishable monophyletic groups with invariable traits as one species.[590] This is the case in some versions of the phylogenetic species concept but it has some drawbacks. One problem is that we will end up with a very large number of very small species.[591] Another problem is that the species category will not be an evolutionary unit.[592] The latter problem is particularly serious for the ecocentrists – both because it makes it less reasonable to talk about species as individuals, and because much of their reasoning is supposed to have an evolutionary basis.

There are many other suggestions, but to give a detailed account of them would take an investigation of its own. I will therefore confine myself to the example above as an illustration of how to cut the segments, and stress that there is no consensus among the advocates of phylogenetics regarding how to solve this problem.

None the less, the phylogenetic species concept has some advantages over the biological species concept. For instance, in many cases it has turned out to be more practical.[593] For some systematists, strict genealogic groupings are important, which makes the phylogenetic species concept a better choice.[594] The proponents of phylogenetics also like to point out that the biological species concept can accept non-monophyletic groups as species.[595] This means that individuals on different branches of the evolutionary tree might form interbreeding populations even though there are other branches between them on the evolutionary tree that are not included in the species. This in turn means that an organism can be closer related in terms of common ancestors to some organisms outside the species than to some organisms within the species. Donoghue considers this to be a very serious problem that shows the biological

[589] Horvath 1997 p.226
[590] Donoghue 1985 p.179, Dupré 1999 p.11
[591] Dupré 1993 p.49, Dupré 1999 p.11
[592] Sterelny 1999 p.136 note 3.
[593] Harris & Froufe 2005 p.6
[594] Donoghue 1985 p.177
[595] Donoghue 1985 pp.175, 176f, Ereshefsky 1999 pp.292f

species concept to be arbitrary, misleading and counterintuitive.[596] On the other hand, the advocates of the biological species concept can defend themselves by pointing out that this argument begs the question in that it is only a problem for those who already believe that phylogenetic descent is more important than belonging to a reproductively isolated population. It does not supply any argument to why phylogenetic descent should be more important than reproductive isolation.

There are other independent arguments for that, however. One thing that is seen as an advantage of sorting organisms by their evolutionary history is that it accounts for the importance of evolution as the process behind biodiversity.[597] There are different opinions regarding the general appropriateness of the phylogenetic species concept when it comes to studying evolutionary processes, however. Grandcolas believes it is very well suited for that purpose,[598] while Dupré claims that we may have to divide the organisms into groups that crosscut phylogenetic lineages in order to study their evolutionary roles.[599]

Another problem regarding the phylogenetic species concept is that actual classification is in practice made by DNA-analysis, but genetic similarity is not always a guarantee for evolutionary relatedness. Genes can, for example, transfer spontaneously between different species of micro-organisms (and possibly also between other species), which makes it difficult, in practice, to make the theoretically important distinction between genetic similarity and evolutionary relatedness.[600]

From an ecocentric viewpoint it is an advantage that the phylogenetic species concept fits very well with the ontological notion of species as individuals or lineages. This is also claimed to be the case with the biological species concept,[601] but the phylogenetic concept is probably even more suited for giving species the ontological status as individuals. The notion of species as individuals is a favourite among ecocentrists and we will have a closer look at it later. The biggest problem with the phylogenetic species concept from an ecocentric perspective ought to be to figure out how the property of 'being made up by organisms with a common ancestor' can generate non-reducible and morally relevant interests. It does not look much easier to show how a common evolutionary history can generate such interests than how reproductive isolation or morphologic or genetic similarity may do so.

[596] Donoghue 1985 pp.175ff
[597] Mishler 1999 pp.309f
[598] Grandcolas et al 1994 passim
[599] Dupré 1999 pp.13f
[600] Johansson, Birgitta 2003 p.10
[601] Sober 1993 p.155

6.1.5. Pluralism

All species concepts have their problems, and people in different fields of biology seem to demand different things from a species concept.[602] Some philosophers and biologists even doubt that it is possible to find one universal species concept that is applicable to all organisms, and that can play all the roles we want it to play in all fields of biology.[603] Robert A. Wilson for example, notes that different species concepts concentrate on different questions. He therefore concludes that we need different species concepts for different purposes, where which concept we choose is a matter of our interests.[604]

Robert Sokal underlines this point by noting that species are defined and named according to one set of criteria, and then they are worked into an evolutionary theory that works with rather different concepts.[605] He also points out that different species concepts suit different organisms,[606] and that both species and speciation are complex phenomena. It is therefore, according to him, unlikely that they can be accommodated by one single concept.[607]

Rossello-Mora believes that pluralism in species concepts is necessary to account for the variation in nature.[608] To try to lump all relevant differences into one concept will, according to him, only cause confusion.[609]

Kim Sterelny believes that it is not possible to find one species concept that can both classify all organisms according to species, and at the same time maintain that 'species' is a biologically important concept. If the property of being a species is evolutionarily significant, it must, according to Sterelny, have been "invented" by evolution several times in different ways and to different degrees – just as with the property of being an organism. There are many different ways of being an organism so there should be different ways of being a species. As a result, Sterelny insists that we need to either accept different species concepts, or accept that there are living things that do not belong to species.[610]

John Dupré claims that there is no reason why all divisions of organisms into kinds should have the same basis (e.g. reproductive isolation).[611] Darwinism has, he claims, showed us that there is not one unique structure in nature for science to discover.[612] He also believes that no single species concept can be found that is optimally informative for all aspects of biology. How to classify an object can, according to him, only be answered based on what the purpose is of

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[602] Reydon 2004 p.301
[603] Atran 1999 p.252, Bock 2004 p.184, Donoghue 1985 p.172, Dupré 1999 p.3, Hull 1999 p.39, Lange 1995 pp.450f
[604] Wilson, Robert A. 1999:1 p.192
[605] Sokal 1973 p.360
[606] Sokal 1973 p.362
[607] Sokal 1973 p.371
[608] Rossello-Mora 2003 pp.325f
[609] Rossello-Mora 2003 p.326
[610] Sterelny 1999 pp.122f
[611] Dupré 1993 p.47
[612] Dupré 1993 p.51

the classification – and what is interesting depends on the circumstances. Therefore we need different species concepts depending on what we want to study.[613]

Thomas Reydon claims that his own view does not belong to pluralism, but that it takes one more step and goes beyond pluralism.[614] He claims that the different species concepts do not just represent different ways of classifying the same thing, but that they in fact deal with four different scientific questions.[615] The term 'species' is according to him used both for units of classification, and for units of generalisation. As units of classification, species are used as the units to which we attach our knowledge of the living world. As units of generalisation, species are used as the units of scientific explanations and predictions. He does not believe that the same concept can play both roles.[616]

An interesting example of the problems of squeezing all life forms into the same species concept is ciliates. Ciliates are very difficult to classify, and David Nanney, who studies them, asks why we believe that we should be able to use the same taxonomy to organise ciliates as we use for organisms with a much shorter evolutionary history.[617] This looks like a reasonable question. Why would all life forms divide themselves in distinguishable groups along the same principles when they do not evolve along the same lines in other respects?

As a result of these considerations, not only the authors mentioned above, but several others as well advocate pluralism regarding species concepts.[618] It has also become more popular in recent decades.[619] According to pluralism, there is not one universally correct way of classifying organisms into species. Instead, there are many equally legitimate ways of classification – different systems for different purposes.[620]

Pluralism would help us deal with the problems above by letting us use different species concepts for different purposes or different life forms. It also lets us account for the flexibility and dynamic in nature,[621] and it would help us adapt theory to practise. When biologists talk about species they are quite pluralistic.[622] There also seems to be a difference between ordinary language classification and scientific classification. This is according to Dupré an argument for pluralism. We need different classifications not just for different scientific studies, but also for ordinary life. It is, for instance, rational to distinguish between onion and garlic in gastronomy but not in biology.[623]

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[613] Dupré 1999 pp.5,11
[614] Reydon 2005 p.150. It seems to me, however, that since it accepts more than one species concept it can still be classified as pluralistic, at least for the purposes of my investigation.
[615] Reydon 2005 pp.136f
[616] Reydon 2005 p.138
[617] Nanney 1999 p.111
[618] As pointed out by Bock 2004 p.178, Dupré 1999 p.3, Horvath 1997 p.225, Hull 1999 p.31, Wilson, Robert A. 1999:1 p.192
[619] Reydon 2005 p.150
[620] Dupré 1999 pp.4,6
[621] Horvath 1997 p.225
[622] Rossello-Mora 2003 p.325. This also fits with my own experience from talking to biologists.
[623] Dupré 1993 pp.28ff

Not everyone agrees that pluralism is a good idea, however. Christopher Horvath argues that the primary role of the species concept is to identify a unique biological unit. This does not work if we resort to pluralism.[624] On the other hand, it is questionable whether finding a unique biological unit is particularly important for biology.

Wilkerson is very critical against pluralism in general and against Dupré in particular. He denies that scientific classifications (contrary to ordinary language-classifications) are a matter of differing human interests.[625]

I believe, however, that Wilkinson has misunderstood Dupré's point. Scientific taxonomy reflects the interests of those who make the classification in the sense that depending on what you study you might need to divide the natural world in different ways. Wilkerson divides the world of human interests regarding taxonomy into groups such as zookeepers, cooks, taxidermists, gardeners – and biologists.[626] He agrees that the former groups have different interests but he seems to deny that the last group have any interests at all, and in particular that different biologists have different interests. To assume that biologists have no interests seems odd and that they do not have different interests is also difficult to believe.

When it comes to the question of whether biologists have interests at all, Wilkinson suggests "biological classification", "producing a classification that is usable" and "to gain prizes and honors …" as possible human interests among biologists, and he concludes that none of these answers are worth taking seriously, since the first is circular, the second trivial and the third just cynical.[627] The interesting thing is that he has forgotten the most obvious answer: Biologists want to study nature. That is their interest.[628] Studying nature can, however, be done in different ways, and most importantly, one can study different parts and different aspects of nature. Two biologists who want to study different aspects of nature obviously have, at least partially, different interests and it might be that these different interests call for different classifications. Biologists too come in different types. There are ecologists, geneticists, evolutionary biologists, etc. Just like zoo-keepers and cooks have reasons to divide the living world in different ways because they are interested in different aspects of the organisms they work with, so do evolutionary biologists and ecologists have reasons to divide the living world in different ways because they too are interested in different aspects of nature.

A more worrying problem with pluralism is that it might be rather confusing to use different species concepts for different purposes. Before Linnaeus, almost every biologist had his own taxonomy and Linnaeus' big achievement was that he changed that. To resort to pluralism looks like a big step backward in that respect. David L. Hull exclaims: "We are drowning in a sea of

[624] Horvath 1997 p.225
[625] Wilkerson 1993 pp.10ff
[626] Wilkerson 1993 pp.10ff
[627] Wilkerson 1993 p.13
[628] They might obviously have other interests too, but they do not seem to be relevant here.

species concepts". For him, the cumbersome excess of species concepts is a good reason to be more monistic.[629]

Hull has tried to find the best compromise species concept by testing different concepts against three basic criteria: Applicability, significance and universality. It turned out that concepts that were easy to apply had a low significance, and conversely, concepts with a high significance turned out to be difficult to apply. There also seemed to be no covariance between the degree of universality and the other two criteria. Thus, he did not manage to find any concept that managed to cope better than the other concepts with all three criteria.[630] This is of course a big problem for the monistic approach. In spite of that, and in spite that he agrees that classification systems are theory dependent,[631] Hull maintains that even if he cannot find one taxonomy that is equally useful for all purposes, it is at least in principle possible to find one single taxonomy and even if it is not possible to find one system that fits all purposes equally well, it is still better to have one taxonomy than to have several.[632] He compares taxonomy with the periodic table.[633] There are many possible ways of ordering the elements, and clearly there are other ways of doing so that would be more useful for certain purposes, but it is still a good idea to have one universally accepted classification.

Even Dupré acknowledges that it would be good if we could have one universal species concept, but he does not believe that nature works that way or that the consequences of not having a universal species concept are as bad as some have suggested. Instead he believes that the advantages outweigh the confusion of having more than one concept.[634] On the other hand, in spite of his pluralism, he talks about the desirability of a lingua franca in which specialists from different disciplines can speak with each other.[635]

The practical difficulties in using more than one species concept might be a good pragmatic argument in favour of monism but it is probably not enough for ecocentrism. In order to be able to claim that species have morally relevant interests in their own right, we need something more solid than a pragmatic need for a common terminology.

What would pluralism in general mean from a preservation perspective – and in particular from an ecocentric perspective? In order to know what is wrong when a species goes extinct, we need to know *what* we lose. Is the problem that there will be no more flying fury things, or is the problem that there will be no more representatives of a certain branch of the evolutionary tree, or that no one will fulfil the function of eating insects and pollinate plants, or that a group of genes will disappear, or that there will be one less interbreeding population in the

[629] Hull 1999 p.44
[630] Hull 1999 pp.41f
[631] Hull 1999 p.36
[632] Hull 1999 p.35
[633] Hull 1999 pp.35f
[634] Dupré 1993 p.52 Rossello-Mora (Rossello-Mora 2003 p.325) agrees about the unimportance of finding a universal species concept.
[635] Dupré 1999 p.18

world? From an anthropocentric perspective, one can imagine different answers to this question that are all relevant. As we have seen in previous chapters, different life forms represent a wide range of different values for human beings. It therefore seems that pluralism would work very well from an anthropocentric perspective. From that perspective it can be problematic if a certain phenetic species disappear and it can be just as problematic if a certain biological or phylogenetic species disappear, or if the number of biologic, phenetic of phylogenetic species decreases.

From an ecocentric perspective things are different. It is not really the properties we are interested in. The problem is not that a certain function will be lost, as such, or that a certain interbreeding population or evolutionary lineage will be lost as such. What we need to know is what it is that generates morally relevant interests. Is it the interbreeding population, or the gene sequence type, or the property of being furry and able to fly … etc.? The way we answer this question will decide how easy or how difficult it is to establish that species have interests, and it will decide what we have to do to establish that they do. The thing is, however, that the ecocentrists have not attempted to answer this question.

If we accept a pluralistic approach, the ecocentrists will have to explain how groups defined by the common properties of their members, how interbreeding populations, and how gene sequence types, etc. can have interests. The more pluralistic we are the bigger the task of establishing moral standing for species will be.

Accepting pluralism therefore looks very problematic for the ecocentrists, but it might not have to be devastating. If nature is in fact divided in different ways, ecocentrists will have to accept that but they do not necessarily have to use all species concepts that are found in nature. As we saw above, several of the pluralists argue that we need different species concepts for different purposes. The ecocentrists could agree with that, accept pluralism, and find one species concept (not necessarily an already existing one) that fits with *their* purposes. This presupposes of course that this concept represents a division that actually exists in nature. If it is just a theoretical construct it will be of no use for the ecocentrists. It will also have the drawback that the resulting species might differ substantially from the species that results from other species concepts. The units that gain moral standing might therefore not have much in common with the units that biologists work within their theories or the units people in general see as suitable for protection.

Rolston is, as far as I have found, the only ecocentrist who mentions pluralism regarding species concepts, though he only mentions it briefly. He acknowledges that it is problematic to define what a species is, and that a pluralistic species concept may be called for.[636] He does not discuss any possible problems for his theory, but as we saw in the beginning of this section, the only thing he worries about regarding the species category is that species exist

[636] Rolston 1988 p.135

independently of us. Does pluralism has any bearing on this particular question? If it is impossible to find *one* correct way of classifying nature, maybe there is *no* correct way of doing it? Scott Atran, for example, suggests that we abandon the species category in the same way as, for instance, 'ether' has been abandoned by physics.[637]

Even if we do not go that far, it might still be quite difficult to maintain that species exist independently of us and that we can have moral duties to them if we take a pluralistic approach. McAlester believes that if species are real there can only be one best species definition.[638] Hull, who is a monist himself, is also pessimistic regarding the possibility of being both pluralist and realist regarding species. He associates monism with realism and pluralism with antirealism, and he believes that the opposite combinations – monism/non-realism and pluralism/realism would be quite peculiar.[639]

Nonetheless, there are writers who claim to be both pluralists and realists. Dupré and Horvath are both examples of this,[640] and according to Horvath most monists are in fact realists.[641] This looks plausible as long as one sticks to the idea that nature divides itself along different lines. There is no problem in being both pluralist and realist if one assumes that there are just several ways of classifying nature that all correspond to the real world.[642]

This is apparently not true for all pluralists, however. Marc Ereshefsky agrees with Hull and claims that pluralism inevitably leads to the conclusion that species have no independent existence at all.[643] According to Ereshefsky, the different species concepts do not have a common theoretically important feature, which he sees as a requirement for a category to exist.[644] According to Reydon, there are two different kinds of pluralism. One that is pluralistic relative to the aim of those who classify, and one that is pluralistic in relation to the organisms that are classified. According to the former, any organism can belong to more than one type of species simultaneously. According to the other, a particular organism can only belong to one type of species but different species concepts are used to classify different organisms.[645] It seems that the latter but not the former version of pluralism can be realistic.

From an ecocentric perspective it is absolutely vital that species have an independent existence. Otherwise it is impossible to see them as moral objects that have interests independently of our interests. This means that if Hull and Ereshefsky are right, ecocentrism cannot accept pluralism. If pluralism is correct and pluralism entails non-realism, then ecocentrism is doomed. If, on the other hand, pluralism is correct and can be combined with realism as claimed by, for

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[637] Atran 1999 pp.252f
[638] McAlester 1962 p.1377
[639] Hull 1999 p.25
[640] Dupré 1993 pp.36, 57, Horvath 1997 p.228
[641] Horvath 1997 p.228
[642] Dupré 1993 p.36
[643] Ereshefsky 1999 pp.290, 303 note 3
[644] Ereshefsky 1999 p.295
[645] Reydon 2004 pp.303, Reydon 2005 pp.151ff

example Dupré and Horvath, ecocentrism still has to deal with the problem of finding moral standing in more than one type of entity. The larger the number of, and the more diverse species concepts we accept, the more difficult it will be. If there really are several types of species out there and only one or a few of these types of species can be a basis for moral status, then ecocentrism will have to leave many existing species with no moral standing.

6.1.6. Species as classes

Different species *concepts* apparently pose different problems for ecocentrism. Now it is time to look at species *ontologies*. In what way – if any – do species exist?

Because species are made up of organisms grouped together by certain criteria, it seems quite natural to conceive of species as classes. This is also the way species traditionally have been perceived.[646] It has turned out that there are some serious problems with this answer, however. Even though the idea of species as classes is often mentioned in relation to the ontology of species, it is not particularly popular among both biologists and philosophers today.

From an ecocentric perspective we have the problem that it is quite hard to conceive of classes as having interests. Even though it is possible to claim that species are classes with an interest in not being empty classes, it seems very farfetched, and far from intuitively appealing. It would also be difficult to explain why only species have this interest and not other classes.

Rolston equates the idea of species as classes with the idea that species are human inventions.[647] As we have already seen, this is the only problem Rolston is concerned with when it comes to the ontology of species. It is therefore easy to understand why he is not very fond of the idea of species as classes.[648]

Callicott, on the other hand seems to accept the idea of species as classes even though he sees it as problematic for at least some forms of ecocentrism. He believes that it excludes the possibility that species can have rights but not that they can have intrinsic value.[649] He briefly mentions David Hull's idea of species as individuals as an alternative to the idea of species as classes, but he does not discuss Hull's idea and he does not seem to pin much hope on it. He just points

[646] Callicott 1986 p.144, Ghiselin 1974 p.536, Reydon 2004 p.301
[647] Rolston 1988 p.134
[648] Rolston 1988 p.135
[649] Callicott 1986 p.144. On the other hand, none of the ecocentric texts I have read argue that species have rights – at least not in its strictly deontologic meaning. It is possible though, that Callicott by 'rights' refers the more general claim that species have moral standing.

out that species as classes is the traditional answer,[650] while Hull's idea is controversial.[651]

For Lawrence E. Johnson it is essential that species exist as individuals, and he therefore attempts to produce some independent arguments against the idea that species are classes.[652] In order to do that, he presents three different and more or less acknowledged methods for arranging particulars into classes, and he concludes that none of them are suitable for arranging organisms into species.

The first of these methods is to find one particular feature and create the class of all things that has the feature in question. The second is to use family resemblance, and the third is simply to use an ostensive definition.[653]

The first method when applied to organisms/species is identical to the phenetic species concept as we discussed above. We saw then that this method is beset with difficulties. Johnson concentrates his criticism on the problem of finding a common property that is not too inclusive and not too exclusive, and still interesting enough to use as a basis for division. He asks us to consider the fact that many species are "highly variable or even polymorphous, contain radically different life stages, or are beset with anomalies."[654] This seems to be a correct observation, and I believe it is a good argument against this method of ordering organisms into classes.[655]

Phenetics and species as classes are two ideas that are seen as going hand in hand. Dismissing phenetics is therefore often seen as enough for dismissing the idea of species as classes. There are other ways of doing it, however. As we saw, Johnson also mentions two other options. The second method he mentions is family resemblance. This method is also mentioned by others,[656] though it is not very thoroughly discussed in the literature in connection with the idea of species as classes.[657] Johnson dismisses it because if we use it, "we do no longer have *the* characteristic of a species" as Johnson puts it, and

> [i]nstead of the species being what it is because it has certain characteristics, a scheme of characteristics is settled upon describing what the species happens to be.[658]

I can see that this is a problem for Johnson since it would make the species more "cluster-like" and less like an individual with its own interests. I am not totally convinced that this is a fatal blow against the idea of species as classes, however. It is true that a division based on family resemblance would go against the traditional Aristotelian and Linnaean idea of species as having essences. The

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[650] Callicott 1986 p.144
[651] Callicott 1986 p.145 I will look at Hull's suggestion in sub-section 6.1.8.
[652] Johnson 1991 p.153f
[653] Johnson 1992 p.146
[654] Johnson 1991 p.153, Johnson 1992 p.146
[655] As also been pointed out by Buege (Buege 1997 p.10).
[656] Reydon 2004 p.302
[657] It is more thoroughly discussed in connection with the idea of species as natural kinds that we will look at in the next sub-section.
[658] Johnson 1992 p.146. Italics in original.

question is: Is essentialism necessary for the idea of species as classes? It is in general assumed that it is,[659] but it has, as far as I know, not been properly argued for. If essentialism is necessary, then family resemblance will clearly not work. If essentialism is necessary for classes, then the only way of ordering organisms into classes would have to be by finding the common property of all organisms that is essential for the classification but that alternative was just dismissed. It would also mean that we would have to restrict the selection of species concepts we can use. Of the three we investigated above, only phenetics would work, and we would be committed to accept it in spite of the problems we found that this concept would have for ecocentrism as well as for biological science.

If essentialism is not necessary, then maybe family resemblance is not a bad way of doing the classification?

The third way of classifying objects into classes mentioned by Johnson was by ostensive definition. That method is dismissed by Johnson on the simple ground that the members of species are constantly changing.[660] That organisms die and new ones are born seems indeed to make the ostensive method very cumbersome for pointing out which organisms belong to which species. On the other hand, we could let the organisms do the sorting for us by saying that "being born by an X Y is to be pointed out as belonging to the class of X Y". This could work once we have done the original sorting. A serious problem with this method is that it would not allow for any new species to evolve. It would also have the effect that for sexually reproducing species we would be committed to the biological species concept including the problems we found this concept to have for ecocentrism.

A general and serious problem with the idea of using an ostensive definition of species is that it would be a very uninformative way of classifying organisms since it does not really say anything about why they are to count as one species. This way of dividing organisms into classes would therefore be quite useless for biologists. It would also be quite useless as a basis for assigning moral standing to species since it does not tell us anything about how this grouping can generate a morally relevant interest in continued existence.

The fact that the individual members of the species are constantly substituted by new ones is used by Johnson not just as an argument against the ostensive method, but also as an argument against species as classes in general. In fact, he seems to consider this to be the primer argument against the notion of species as classes.[661] I am not sure why this would make it impossible to see species as classes, however. It is not unusual that things are exchanged in classes. The class of all blue things also has its members exchanged. New blue things are produced and things that originally had other colours are sometimes painted blue. In the same way, originally blue things sometimes get painted in other colours and some blue things get destroyed.

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[659] Wilson, Bradley E. 1995 p.340
[660] Johnson 1992 p.146f
[661] Johnson 1992 p.147

I believe that the simple fact that members of species are constantly substituted is not a problem as such. The problem is rather *how* members of species get substituted. Blue things come and blue things go but species *evolve*. If all blue things are successively substituted with green things, the class of blue things will be smaller and eventually become empty. When we talk about species we need to allow for the species to evolve. To see species as classes would, as Bradley E. Wilson points out, make us unable to account for the role of species in the evolutionary process. If a species is defined based on what properties its individuals have, then the species cannot evolve with respect to those properties without thereby immediately turning into a new species.[662]

In this way, the notion of species as classes resembles the suggestion that species should be conceived of as Platonic ideas. J Baird Callicott discusses this idea as a way of circumscribing the ontological problem in a way that would suit ecocentrism.[663] If species are seen as ideas, the species will be more real than the individual organisms that instantiate the idea. This would clearly favour ecocentrism. As Callicott also points out, however, if we see species as Platonic ideas, there would be no point in protecting species since the ideas can never be threatened by extinction.[664] We seem to have the same problem if we see species as classes. Classes do not cease to exist even if they are empty.[665] The class of all blue objects in my apartment exists even if I do not have any blue objects in my apartment. It will be an empty class but the class will still exist. Correspondingly, if the red kite species (milvus milvus) is a class then the class will continue to exist even if all red kites are dead. This clearly makes the idea of species as classes unsuitable both for ecocentrism and for preservation purposes in general.

Bradley E. Wilson also presents another argument against species as classes. He points out that it does not account for the genealogical relations between the members of a species, something that is very important for understanding the concept of species.[666] We would thus if we see species as classes, not be able to use the phylogenetic species concept. Whether this is a good argument depends of course on whether you accept the phylogenetic species concept as at least a realistic contender, and what purpose you have with your classification. If your purpose is to use species as units of evolution Wilson is clearly right, and to adopt a species concept that would make species useless for that very important task looks like a good argument against that concept. According to ecocentrism, the evolutionary process is very important, and I therefore suspect that this last argument by Bradley E. Wilson is a rather important reason for ecocentrism to reject the notion of species as classes.

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[662] Wilson, Bradley E. 1995 p.340
[663] As we saw above, Callicott accepts that species are classes.
[664] Callicott 1986 p.144
[665] Buege 1997 pp.9f
[666] Wilson, Bradley E. 1995 p.340

6.1.7. Species as natural kinds

One idea that is adjacent to but more elaborate than species-as-classes, is the idea that species are *natural kinds*.[667] This idea has more supporters among modern biologists and philosophers of biology than the idea of species as classes. [668] It is also embraced by at least one ecocentrist, viz. Rolston.[669] Callicott accepted, as we saw above, the idea of species as classes, but he seems to see the ideas of species as classes and species as kinds as equivalent.[670] Johnson, who argued against species as classes, will probably not be much more positive towards the idea of species as natural kinds considering that these two ideas have quite a lot in common. The first two methods that Johnson discussed above of how to divide organisms into classes are for instance also used to divide organisms into natural kinds. The idea of species as natural kinds is also in general seen as a competitor to Johnson's favourite theory that conceives of species as individuals. On the other hand, Rolston seems to be able to embrace both these ideas. He does not elaborate on the relation between the two ideas, but it is clear from his reasoning that he sees them at least as strongly related, and possibly even as identical.[671] It is also clear, however, that the idea of species as natural kinds is very important for Rolston's theory, not least in connection with his idea that morally relevant interests are about having a good-of-one's-kind.[672]

Just like when species are conceived of as classes, species conceived as natural kinds are grouped together because of some common property or set of common properties. There are differences, however. When we talk about natural kinds not any property or set of properties will do. Natural kinds are seen as the basic units of natural laws and scientific explanations.[673] The demands are therefore much more elaborate and rigorous than with classes where any property that we find interesting enough will do. This also means that the notion of natural kinds is necessarily realistic.[674] If species are classes, they might be real but they can just as well be something dreamt up by us, and as we remember from the previous sub-section, Rolston believed that seeing species as classes was equivalent to seeing them as man-made. If we treat species as natural kinds with essences, which traditionally is the standard way of thinking about natural kinds,[675] they must have an independent existence.

The idea behind essentialism is basically that some entities have a common set of intrinsic non-contingent properties that they have independently of us (and

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[667] Donoghue and Reydon (Donoghue 1985 p.172, Reydon 2004 p.302, Reydon 2005 p.149) treat them as the same idea and there are clear similarities but I still believe they are distinct enough to be treated differently.
[668] Boyd 1999 pp.141, 146, Sober 1993 p.145, Sterelny 1999 p.131
[669] Rolston 1988 pp.68, 75, 103, 136, 144, 309, Rolston 1999 p.124
[670] Callicott 1986 p.144 He does not mention *natural* kinds however.
[671] See e.g. Rolston 1988 pp.136. 272
[672] Rolston 1988 p.103
[673] Ereshefsky 1991 p.96
[674] Dupré 1993 pp.5f
[675] Bock 2004 p.178, Dupré 1993 p.6, Ereshefsky 1991 pp.95f, Reydon, 2005 p.145, Sober 1993 p.145, Wilson, Robert A. 1999:1 pp.188f

of whether we have discovered them or not), and independently of their relations to other objects.[676] These properties are seen as the *essence* of the natural kinds. All entities that are members of the same natural kind share the same essence. They have the same set of intrinsic properties where each property in the set is necessary and the whole set of properties taken together is sufficient for making the object that has it a member of a certain natural kind.[677]

Species are often seen as paradigmatic examples of natural kinds together with, for example, chemical elements.[678] Apart from these examples, different authors count different things as natural kinds. Wilkerson and Dupré, for instance, count not just chemical elements, but also chemical compounds (like water) among the natural kinds.[679]

Rolston sees landscapes but not cancer cells as natural kinds,[680] and correspondingly the former but not the latter makes preservation demands on us. For Rolston, the connection between being a natural kind and having moral standing seems to be very close. It is apparently not just a matter of the former being a prerequisite for the latter. Being a natural kind seems to be sufficient for having a good of one's kind. Neither chemical elements, nor chemical compounds are seen as moral objects by ecocentrism, however, which means that just as with classes, the ecocentrist that, like Rolston, accepts the notion of species as natural kinds has to explain why only some natural kinds give rise to morally relevant interests.

Even though species as natural kinds is a more popular idea than species as classes, many philosophers have concluded against it,[681] and most biologists do not actually treat species as natural kinds.[682] The similarities with the species-as-classes idea make it vulnerable to many of the same objections. Kinds can, for instance, just as classes, have zero members.[683] This is, as we saw above, a rather serious problem from an ecocentric perspective since it means that if we accept that species are natural kinds, the species as such can never disappear even if it no longer has any members.

There are also other problems with the idea of species as natural kinds. It is sometimes claimed that natural kinds is an improper way of conceiving of species because species are limited in time and space, while natural kinds are not.[684] Species appear, exist for a while in a certain area and then disappear. The area can be as small as the interior of another organism or as large as the entire planet, but it is always possible, at least in theory, to point out its location. This cannot be the case with natural kinds if we wish to maintain that they are the

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[676] Reydon 2005 p.138, Wilkerson 1993 p.1, Wilson, Robert A. 1999:1 p.187
[677] Boyd 1999 p.146, Dupré 1993 p.6, Sober 1993 p.145, Wilkerson 1993 p.1, Wilson, Robert A. 1999:1 p.188. The set of properties can contain one single property in which case having that property is both necessary and sufficient for being a member of the kind.
[678] Boyd 1999 p.158, Griffiths 1999 p.209, Wilkerson 1993 p.1
[679] Dupré 1993 p.40, Wilkerson 1993 p.1
[680] Rolston 1988 pp.103, 198
[681] See e.g. Ereshefsky 1991 pp.96, 98 and Sober 1993 pp.148f
[682] Sober 1993 p.148
[683] Sober 1993 p.145
[684] Boyd 1999 p.145, Dupré 1993 p.41, Griffiths 1999 p.211

basis of natural laws. Natural laws are conceived of as universal and cannot be limited to particular places or points in time, or particular objects.[685] In order to play the role of basic units in universal natural laws, natural kinds can therefore not be limited in time or space.[686]

Even if gold atoms were to only exist in some parts of the universe, the natural laws that govern gold are still universal. If gold atoms turn up in a part of the universe where there has never been gold before, they still behave exactly as all other gold atoms in the universe in relation to different physical circumstances and they all have atomic number 79. Even if it would happen that all now existing atoms with atomic number 79 would disappear and then new ones emerge from a supernova many eons later, the new atoms will be gold. If all exemplars of the fairy tern (gygis alba) were to disappear and then as a fluke of nature eons later on another planet, new organisms with the same genetic makeup and the same morphological properties turned up, would they be fairy terns? Not according to either the biological or the phylogenetic species concept. The new populations would have no interbreeding connections with the fairy terns now existing on the Seychelles, and they would not descend from them. The only species concept of those we have discussed that could fit with the idea of species as natural kinds would thus be the phenetic species concept. The other concepts do not classify species based on common properties of the members of the species.[687] As we remember, however, phenetics is the least popular concept, both in general and among ecocentrists.

In a nutshell, the problem is that if we define species based on essential properties, then anything that has these properties will be a member of the species independently of whether it has any relation at all with other members of the species – spatially or temporally. For many who see species as something that is bound and limited in both space and time, that is quite bluntly at odds with how they conceive of species.

As Dupré points out, however, this is only a problem given a particular way of conceiving of species, viz. that species are in some way individuals. The problem thus assumes that we have already decided to see species as individuals *and not* as natural kinds.[688] If one does not see species as individuals but as natural kinds, then the effects above will just not be a problem. The thing is, however that if we do not see species as in some way bound together, it is quite difficult to see them as having interests qua species.

There is also another problem: The explanation why natural kinds cannot be spatiotemporally bounded is, as we saw, that they are the basic units of universal natural laws. It is often denied that species are being subject to universal laws however.[689] Biology as opposed to, for example, physics is said to be a historical science. This means that its aim is not to discover laws that govern the species,

[685] Lange 1995 pp.430f, Reydon 2005 p.148, Sober 1993 p.14
[686] Griffiths 1999 p.211
[687] Boyd 1999 p.145, Sober 1993 p.148
[688] Dupré 1993 pp.41f
[689] Boyd 1999 p.145, Dupré 1993 p.40, Lange 1995 p.430, Resnik 1994 pp.3f

but to produce descriptions of the species and their evolutionary history.[690] This in turn means that species are often used in biology as historical entities and not as natural kinds.[691]

Not everyone agrees about this. A number of biologists and philosophers believe that biology does produce natural laws and therefore requires species to be natural kinds.[692] Griffiths believes that it is possible to make law like constructions about species even though there are many exceptions to the laws. For instance, he points out that it is possible to make predictions about future members of a species.[693] Marc Lange and John Dupré are on the same track and they motivate their belief by claiming that natural laws can have exceptions and that it therefore is possible to form natural laws concerning particular species.[694] Marc Lange also suggests that natural laws can refer to particular times and places and to individual objects and that there can therefore be natural laws concerning particular species.[695]

These assertions are controversial and there is a large debate over whether natural laws can be exceptionless. Dupré refers to social science and meteorology as examples of other subjects where laws have exceptions.[696] The reference to social science does not do much good since there are no natural laws in social science. Whether there are exceptions from the natural laws used in meteorology depends to a large degree on where we stand in relation to the question of reductionism in science, i.e. on whether we can reduce all meteorological phenomena to basic laws of physics.

Dupré also suggests that there *are* generalisations about species that are always true. "All humans are mortal" is an example of this. He concludes, however, that this type of generalisation does not give us what we need since it has nothing to do with us belonging to a certain species. The law operates on a much higher level.[697]

Boyd attacks the problem from a third direction. He argues that it is not necessary to be the subject of natural laws to be a natural kind.[698] Instead he claims that for something to be a natural kind, it is enough that the reference to it is important for the formulation of natural laws.[699] The question one then has to ask is what we would gain by seeing species as natural kinds. The only thing that would be left of the idea that species are natural kinds if they are not to be used as units of natural laws is that species have essences. As we will see later, however, Boyd is prepared to give up that too as a response to the next problem.

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[690] Sober 1993 pp.14f
[691] Sober 1993 p.149
[692] Griffiths 1999 pp.212ff, McIntyre 1997 passim, Resnik 1994 passim, Sober 1993 p.15
[693] Griffiths 1999 p.222
[694] Dupré 1993 p.41, Lange 1995 passim
[695] Lange 1995 passim
[696] Dupré 1993 p.41
[697] Dupré 1993 pp.40f
[698] Boyd 1999 pp.145,157
[699] Boyd 1999 p.157

When we looked at the phenetic species concept we realised that the variety between different individuals of the same species is sometimes so large that it is difficult, if not impossible, to find a set of properties or even a single property that all individuals of a species share.[700] We also found that this was a serious problem for the most common way of dividing organisms into classes. This problem becomes extra serious if we want to conceive of species as having essences in the form of necessary and sufficient intrinsic properties.[701] For the idea of species as classes, it was enough to find shared properties and we saw that this did not work very well. For the idea of species as natural kinds, we need the common properties to be essential which makes it even more difficult. This is – not surprisingly – used as an argument against the very idea of species as natural kinds.[702] It is, in fact, common to state that Darwinism makes essentialism impossible by showing that variation is an unavoidable part of life.[703]

Even though Dupré is very sceptical to essentialism,[704] he tries to defend it against this argument by pointing out that no natural kinds are totally homogenous. Not even atoms. There are different isotopes and different energy levels of electrons in an atom.[705] This is not enough to make species analogous with atoms when it comes to essential properties, however. Even though there is great variation among atoms of the same element, they keep their identity in the periodic table as long as they have the same atomic number. We have no such property in species. The variation among atoms of a certain kind is also much smaller than the differences between atoms of different kinds. Different elements have dramatically different properties. For some species on the other hand, there is more variability within species than between species.[706] As Robert A. Wilson points out, the sexes are often quite different – sometimes very different. In many species, two individuals in different stages of their life cycle can also be very different.[707] In fact, for some species the difference between sexes or between the different stages of the life cycle of the same species can be larger than the difference between organisms of different species but of the same sex or in the same stage of their life cycle. The morphologic differences between a caterpillar and a fully evolved butterfly of the same species are, for example, larger than the differences between two caterpillars of different species. The morphological differences between a male duck and a female duck of the same species are also, in some cases, larger than between two female ducks of different species.

This is true not only for morphological characters. There are also genetic differences between individuals of the same species that sometimes exceed the

[700] See also Wilkerson 1993 pp.3, 7, and Wilson, Robert A. 1999:1 p.190
[701] Boyd 1999 p.145, Dupré 1993 p.53
[702] Dupré 1993 pp.39, 53
[703] Dupré 1993 pp. 38, 54, Ereshefsky 1997 pp.493f, Ereshefsky 1999 pp.287, 294, Reydon 2005 pp.138, 145
[704] Dupré 1993 p.6
[705] Dupré 1993 p.39
[706] Dupré 1993 p.54
[707] Wilson, Robert A. 1999:1 p.190

genetic differences between individuals of different species.[708] In fact, we cannot even refer to the number of chromosomes as the essence of species since there is variation within species also in that respect.[709]

A proponent of the biological species concept might want to claim that reproductive isolation can be an essential property in species. Unfortunately, not even that works, however. Reproductive isolation is never absolute. Hybridization happens in all of nature (though especially among plants, fishes and amphibians).[710] This means that reproductive isolation cannot be an essential property in species.[711]

Even though Wilkerson is expressly aware that the genetic variation is sometimes larger within species than between species, he still wants to maintain that biological natural kinds are determined by their genes.[712] As a result, he admits that there are more natural kinds than species. He even admits that there is a real but small possibility that there are as many kinds as there are individuals.[713] This solution is quite puzzling. It looks like Wilkerson in fact tries to save the idea of natural kinds in biology by *disconnecting* it from the 'species' category. This clearly makes the suggestion less biologically interesting. It also means that even if his suggestion turns out to be viable, we cannot use it for our purpose. It is highly unlikely that any ecocentrist would give up species as their object of concern and substitute it with a concept of natural kinds that is disconnected from species and might even lead them to place their concern on the organism level rather than on the species level – even though Wilkerson judges that the latter probability is small.

When we discussed species as classes, we found that the fact that species evolve makes them unsuitable as classes. We have the same problem when it comes to natural kinds: Species evolve while kinds do not.[714] The essence of the natural kind 'gold' is said to be that it has atomic number 79. If some gold atoms end up in a supernova and change their atomic number they are no longer gold but some other element. Even so, gold as a natural kind still has the atomic number 79. The *kind* is rigid in relation to what properties its members have but it is variable in relation to what members belong to the kind. The *instances* of the kind on the other hand are variable in both respects. They might change their properties and as a result cease to be a part of the class of which they were previously members. With species it is quite different. In a way it is actually the opposite: *Species* are variable in relation to properties but rigid in that if an organism is a member of the species, it always will be as long as the organism exists. The *organisms* in turn might change their properties, but are rigid in the meaning that an organism that belongs to one species never moves to another species no matter how much it changes.

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[708] Dupré 1993 p.54, Wilkerson 1993 p.7, Wilson, Robert A. 1999:1 p.190
[709] Wilkerson 1993 p.8
[710] Dupré 1993 p.56
[711] Dupré 1993 p.56
[712] Wilkerson 1993 p.16
[713] Wilkerson 1993 pp.16f
[714] Dupré 1993 pp.39f, Griffiths 1999 p.211, Sober 1993 pp.146f

As Dupré points out, natural kinds do not have to be totally unchangeable. Water is according to Dupré an example of a natural kind that changes. It can be created and destroyed, heated and cooled, etc. and still retain its identity. He claims that the same is true for species, as long as we can identify the kind independently of the changeable properties.[715]

Dupré is clearly right that natural kinds do not have to be totally rigid. Only the essential properties have to be unchangeable. This clearly limits the problem but it does not totally solve it. What do we do if the essential property changes? All species still have to have at least one property (probably more) that will never be allowed to evolve without the species immediately turning into a new species and that no member of the kind can lose without losing its species membership.

When black members of the peppered moth (biston betularia) first turned up and eventually became quite common in industrialised parts of Britain as a result of increased pollution, they were not classified as a new species. Instead it was accepted that the species had gone through changes but was still the same species. It was still biston betularia. Almost a hundred years later following the clean air act in Britain, the percentage of black peppered moths decreased and the percentage of "peppered" peppered moths increased. The species changed again but still remained the same species.[716]

This type of change could only occur within a natural kind if the property "pepperedness" is not an essential property. We would therefore have to choose carefully what to consider an essential property when we define a species. We saw above that we need a set of intrinsic non-contingent properties that all members of the species have in common. Apparently we need to see to that it is a set of properties that is not only shared by all species members who happen to live at the time when we name the species, but also of all future organisms that we want to include in the species. This looks like a very difficult problem considering that evolution does not seem to have any limitations regarding what properties to change.

Elliott Sober does not believe that the occurrence of new organisms with new properties is a devastating problem for the idea that species are natural kinds. He points out that an atom of one kind can change into an atom of another kind without this interfering with the statement that all gold atoms share the same essence. That a population of organisms can give rise to another population is not a problem according to Sober. There is, he claims, nothing strange about an object and its descendant falling into different categories.[717]

In other words, Sober's strategy is to accept that whenever organisms turn up that have changed with respect to the essential properties, we have a new species. This would mean that if "pepperedness" is an essential property in peppered moths, the black "peppered moths" in the example above would not be peppered moths at all but a new species. This move is clearly possible and in many respects perfectly acceptable. There are two problems, however. One is

[715] Dupré 1993 pp.39f
[716] Smith & Smith 1998 pp.248f
[717] Sober 1993 pp.146f

that we would have an immense inflation of the number of species. The other is that it would have quite serious consequences for biological science, and I do not expect that many biologists would accept them. Many statements made in biology would have to be branded as false and evolutionary theory would have to be modified. Most biologists would probably not be prepared to pay this price. I also suspect that advocates of ecocentrism would deem this way of "creating" new species as too superficial for the new species (like the "black peppered moths") to fit into their theory of species as moral objects.

Sober's solution would also lead to some odd effects. Let us say that we have a species of which the essence is the property X. Let us then assume that one day a member of that species gives birth to an offspring that lacks X. Then we have a new species. Let us then on top of that, assume that the brothers and sisters of this individual have X. Then we would have individuals that are siblings but belong to different species, which seems quite counterintuitive. If then the offspring of the X-less individual are in their turn born with the property X, we would have a new species that exists for only one generation, is made up of only one individual, and all the relatives of this individual would belong to another species – which in turn also means that it would exist within both the phylogenetic branch and within the reproductive population of another species.

There might be another and more radical solution, however. Some proponents of natural kinds have in fact argued for non-essentialist versions of the theory. It takes us quite far from the traditional way of conceiving of natural kinds. It also takes away any opportunity for the ecocentrist to refer to essences or to universal natural laws concerning species, but maybe it can save the notion of species as natural kinds.

As we have seen above, 'natural kinds' and 'essentialism' are very intimately connected concepts. Some authors even treat them as synonyms.[718] Even so, it is probably true as both Boyd and Robert A. Wilson point out that essentialism and what it stands for is a burden for the idea of species as natural kinds.[719] The question is therefore: Is it possible to keep the idea of natural kinds while discarding that of essentialism?

Boyd believes it is. He believes that most of the objections discussed above are based on an "outdated positivist conception of kinds".[720] The outdated positivist conception that Boyd refers to is explained as a tendency to see the criteria for natural kinds as being "*eternal, unchanging, ahistorical, intrinsic, necessary* and *sufficient* conditions" together with the role of natural kinds as stating laws that are "*exceptionless, eternal* and *ahistorical* generalizations".[721] He argues that natural kinds ought not to be conceived of in this way. Instead, he

[718] Dupré 1993 p.6, Ereshefsky 1997 p.499, Sober 1993 p.148
[719] Boyd 1999 p.151, Wilson, Robert A. 1999:1 p.188
[720] Boyd 1999 p.145
[721] Boyd 1999 p.151 Boyd's italics

has formulated an alternative non-essentialist concept of natural kinds.[722] The idea is that species are what he calls *homeostatic property cluster kinds*.[723]

According to this idea, natural kinds are defined, not by a set of essential properties, but by a cluster of homeostatic properties. It is not the case, according to this concept, that any one member of the kind must possess the whole cluster of properties to be a member, but all members of the kind must possess *enough* of the properties. That the properties are homeostatic means that they work in such a way that they increase the probability that the other properties of the cluster will also be instantiated in the same entity.[724] No single property is essential and no property can be called the essence of the species.[725] This way, the homeostatic property cluster view allows for variation among entities of the same kind.[726] We will thus stay clear from one of the major problems of essentialism.

Species is, according to Boyd, one of the things that count as natural kinds in the form of homeostatic property clusters.[727] In their case, because they exhibit homeostatic mechanisms like

> gene exchange between certain populations and reproductive isolation from others, effects of common selective factors, coadapted gene complexes and other limitations on heritable variation, developmental constraints, the effects of the organism-caused features of evolutionary niches, and so on.[728]

I interpret this to mean that species are homeostatic due to the mechanisms that keep the species together but also isolated from other species. Obviously this will not work with all natural kinds (for example chemical elements), but as I understand Boyd, that is not necessary. Kinds can be homeostatic in different ways.

A problem with Boyd's theory is that it is not obvious that the homeostatic property cluster view manages to distinguish between closely related species. If we use clusters of non-essential properties, it is not at all clear how we are supposed to draw the line between different species without overlap.

Another problem is how to decide how much and how many of the homeostatic properties are enough for an organism to belong to a certain species. Robert A. Wilson does not believe that this problem is a serious threat to the idea. He does not believe that there needs to be one universally applicable answer to the question: How much is enough? Instead, he believes that how much is enough will differ from case to case in a way that reflects the structure of the

[722] Boyd 1999 pp.151ff
[723] Boyd 1999 p.143
[724] Wilson, Robert A. 1999:1 p.197
[725] Wilson, Robert A. 1999:1 p.199
[726] Wilson, Robert A. 1999:1 p.198
[727] Boyd 1999 pp.164f, 167
[728] Boyd 1999 p.165

world.[729] He admits that there will still be indeterminable cases, but that this also reflects the real world since there in fact exists intermediate cases in the world, for instance, as a part of the speciation process.[730]

An interesting aspect of Boyd's version of natural kinds is that he follows Dupré in claiming that even categories in nature that are not classified as species or even as a taxon by science can be natural kinds. Lilies are seen by most people as a category of plants although the borders of this category do not coincide with the borders of any recognised species or higher taxa.[731] Even so, 'Lily' is, according to Boyd, a natural kind.[732]

That "folk biological" concepts like 'lilies' count as natural kinds, according to Boyd's interpretation, looks like a good thing from an ecocentric perspective. I believe that the intuition that there is something morally wrong in causing the extinction of species would insist that this also goes for the category 'lilies' as well as other "folk biological" concepts. It becomes more problematic if we look at what other units the list of natural kinds includes. Even the traditional concept of natural kinds includes other things than species. We have seen that chemical elements are seen as paradigmatic cases of natural kinds. It seems very reasonable to assume that from a strictly anthropocentric instrumental perspective, the permanent loss of a chemical element would warrant concern of about the same kind and partly for the same reasons as the extinction of a species. It is more difficult to see how chemical elements can be moral objects, however. This is a general problem regarding natural kinds, but if we accept Boyd's version that problem tends to be even worse. Boyd considers even historic periods and concepts like Christianity, empiricism, behaviourism, etc. to be natural kinds.[733] If it is difficult to see chemical elements as moral objects, it is even more difficult to include things like behaviourism or historical periods among the moral objects, and I seriously doubt that this would be accepted by most ecocentrists. We therefore seem to face the same problem we faced when we discussed species as classes: If species are natural kinds, then why are species moral objects while other natural kinds are not?

The number of natural kinds, according to Boyd's definition, might also increase for another reason. According to Griffiths, Boyd's idea takes away the difference between natural kinds and artificial kinds. If natural kinds do not need to have essences and do not need to be basic units of natural laws, anything that can play the relevant causal role and thus be referred to in the formulation of natural laws will be a natural kind – even if it is a manmade object.[734]

If Griffiths is right, Boyd's version of natural kinds implies that the number of objects that have to be excluded from the realm of moral objects by some other means than their ontological status will be quite extensive. This is not

[729] Wilson, Robert A. 1999:1 p.201
[730] Wilson, Robert A. 1999:1 p.201
[731] Dupré 1993 p.28
[732] Boyd 1999 p.161
[733] Boyd 1999 pp.155f
[734] Griffiths 1999 p.218

necessarily a devastating problem, since we might find other ways of excluding the non-species. Considering, however, that the morally relevant interests that all species are claimed to have according to ecocentrism must be intrinsically connected to what it means to be a species at the same time as they must not be found in things that the ecocentrists deny moral status, this will not be an easy task.

The inclusion of "folk biological" concepts such as 'lily' in the same ontological category as species that, to begin with, looked like an argument in favour of Boyd's version of natural kinds, may also present a problem of its own for the ecocentrists. The biological functioning of the species is very important for all ecocentrists. This means that including categories that have no clear biological status would considerably complicate the justification of their theory.

Are natural kinds in Boyd's sense real? The realism of natural kinds in the traditional form is a clear advantage from the viewpoint of ecocentrism. If we take away essentialism from the natural kinds, it is no longer obvious that they have to have an independent existence. On the other hand, the opposite is not necessary either. Dupré underlines that the question of whether species have essences should be kept apart from the question of whether species are real.[735] This is clearly correct even though essentialism would guarantee realism. For Boyd's version of natural kinds, much seems to depend on how the clusters are limited. According to Robert A. Wilson, that problem would more or less solve itself as a result of the structure of the world. The homeostatic property cluster view is thus, according to Wilson, realistic since it claims to inform us about the way the world is really organized.[736] According to Boyd, natural kinds are human constructions.[737] Even so, they are according to him real in a relativistic sense. They can be real within the framework of one discipline but not in the framework of another discipline.[738]

I am not sure that this is enough for ecocentrism. It brings to mind Dupré's "promiscuous realism" regarding pluralism, and Boyd explains that he believes that a pluralism of species definitions corresponds to and helps achieve a correct understanding of the different causal structures in biology.[739] What ecocentrism needs, however, are not species that are real within the framework of an anthropomorphic theory, but species that are real in a way that is independent of us. If we are forced to deny or to leave the question open of whether species *independently* exist, this version of natural kinds has lost an important advantage in relation to the idea of species as classes from the point of view of ecocentrism.

Comparing the pros and cons of the different versions of natural kinds, it still looks like Boyd's version is a more promising ontology of species than traditional essentialistic natural kinds. From a strictly ecocentric perspective, however, it is probably not an improvement. It might even be more problematic.

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[735] Dupré 1993 p.38
[736] Wilson, Robert A. 1999:1 p.198
[737] Boyd 1999 pp.174f
[738] Boyd 1999 p.160
[739] Boyd 1999 pp.170f

6.1.8. Species as individuals

In the previous sub-section we saw that one of the main problems with the idea of species as natural kinds is that species are spatiotemporally limited, which makes it difficult to conceive of them as kinds. Kinds are, as we noted, normally seen and treated as universals. Individuals, on the other hand, always exist in a particular spatiotemporal slot. An individual comes into existence at a particular place at a particular point in time, exists in a certain area for a certain period, and eventually ceases to exist. The same is the case with species, which means that at least in this particular respect, species seem to be more like individuals than like kinds. Some biologists and philosophers have therefore chosen to talk about species as individuals.[740]

To see species as individuals fits very well with how species are conceived of in evolutionary theory. Since species are the entities that evolve according to evolutionary theory, it is more natural to see them as individuals than as kinds or classes.[741] According to Hull, species in fact *have to* be conceived of as individuals bound in space and time because of the role they play in evolutionary theory.[742] It is even held that evolutionary theory *shows* species to be individuals.[743] At least, the idea of species as individuals has several advantages from an evolutionary perspective. To see species as individuals and not as kinds fits better with the fact that organisms can change and still belong to the same species.[744] This posed a big problem for the idea of species as kinds but it seems only natural if we see species as individuals. Individual organisms, after all, retain their identity even though their bodies change.

Talking about species as individuals also fits better with the belief held by many biologists and philosophers of biology that there can be no natural laws about species.[745]

Another advantage is that if we see species as individuals, we do not have to rely on common properties to bind the species together.[746] The parts of an individual can be very different from each other. An arm, a heart and a nail are very different from each other even though they are parts of the same organism.[747]

This means that the idea of species as individuals does not fit with the phenetic species concept.[748] On the other hand, this might not be a very big disadvantage as we saw that this concept has large problems of its own and is not very popular among the ecocentrists.

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[740] Dupré 1993 p.270 note 3, Ereshefsky 1991 pp.84, 96, Ghiselin 1974 p.536, Horvath 1997 pp.226f, Hull 1999 pp.31ff, Sober 1993 p.15, Sterelny 1999 p.123, Wilson, Bradley E. 1995 p.340, Wilson, Robert A. 1999:1 p.191. Ghiselin and Hull are the most prominent advocates of the theory.
[741] Hull 1999 p.32
[742] Hull 1999 p.31
[743] Sober 1993 p.145
[744] Wilson, Robert A. 1999:1 p.191
[745] Buege 1997 p.16, Donoghue 1985 p.172, Lange 1995 pp.432, 436
[746] Ghiselin 1974 p.537
[747] Buege 1997 p.10
[748] Wilson, Robert A. 1999:1 p.191

The other two species concepts that we investigated (the biological and the phylogenetic) are very compatible with the idea of species as individuals.[749] Christopher D. Horvath goes as far as equating the idea of species as individuals with the phylogenetic species concept,[750] while Elliott Sober on the other hand equates it with the biological species concept (that he calls "the individuality thesis").[751] It seems clear, however, that both the biological and the phylogenetic species concepts are compatible with the idea of species as individuals, which ought to speak in favour of this idea.

An interesting aspect of the idea that species are individuals is that it also affects the status of the organisms that make up the species. If we see species as kinds or classes, organisms become *members* or *instances* of the species. If we on the other hand see species as individuals, organisms instead become *parts* of the species just like limbs and cells are parts, not members or instances, of the organism they belong to.[752]

This has implications for ecocentrism in that it affects how they can fit individual organisms into their theory. If we reason from an ecocentric basis, it will look something like this:

The value of an entity according to ecocentrism is to a large degree determined by its role in the system. A *part* ought to be less autonomous and more integrated than a *member* in relation to the whole. Therefore, the value of a *part* is probably more closely connected to that of the whole than is the case with a *member*. This in turn means that, on the one hand, a part can more easily be sacrificed for the sake of the whole. On the other hand, a part that functions together with other parts might be a more substantial loss from the perspective of the whole than the loss of one of many members with the same essential properties.[753] Even though parts of an individual can be sacrificed when called for, they are not exchangeable or expendable in the same way as members of a kind that are all identical when it comes to the properties that make them members of the whole.

The conclusion is therefore that the interest of a part means less than the interest of a member in relation to the interest of the whole, but for the whole it ought to be more of a value loss if it loses some of its parts than if it loses some of its members – even if the loss does not kill it. If organisms are parts and not members of their species, the interests of the organisms will in the same way matter less in relation to the interests of the species compared to if the organisms were members of the species. On the other hand, it is more of a value loss for the species to lose some of its organisms if the organisms are parts than if they are members, even if the loss does not lead to the extinction of the species.

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[749] Wilson, Robert A. 1999:1 pp.191f
[750] Horvath 1997 p.226
[751] Sober 1993 pp.153ff
[752] Buege 1997 p.10, Ghiselin 1974 p.536, Griffiths 1999 p.211, Reydon 2005 p.149
[753] Remember that according to ecocentrism species have interests of their own that are not reducible to the interests of the organisms that make up the species.

This conclusion is very important for how individual organisms should be regarded from an ecocentric, and also, to some extent from an anthropocentric position. If the notion of organisms as parts rather than members of their species implies a higher *instrumental value* for the individual organisms in relation to the species, it will strengthen our preservation duties. The non-human organisms do not have any moral status of their own from an anthropocentric perspective, but a reduction of the number of organisms that make up a valuable species has effects on the function of the species even if the species does not go extinct. It means that if species are integrated enough to be individuals we have to be more careful not just to avoid extinction but also to avoid losing too many parts of the species in order to not disturb the function of the species and thereby diminish the value the species has for us.

From an ecocentric perspective, the most important aspect of the idea that species are individuals is probably that they get the same ontological status as organisms.[754] This is important because individuals are traditionally seen as the paradigm cases of moral objects.[755] If species have the same ontological status as organisms it will not be possible to dismiss ecocentrism on the account that species have the wrong ontological status unless one is also willing to deny that living organisms including human beings have moral status.

Not surprisingly, the idea of species as individuals has caught on among ecocentrists. Rolston, Callicott and Johnson use the idea to support their standpoints.[756]

We have seen that Rolston talks of species both as natural kinds and as individuals. This is a rather bold strategy considering that the two ideas are normally seen as contradicting each other.[757] There are those who argue that they are compatible, however. Boyd, who advocates a rather unconventional version of natural kinds, is not a supporter of the idea that species are individuals. Even so, he claims that there is no real contradiction between seeing species as individuals and seeing them as kinds.[758] On the contrary, those who claim that species are individuals must, according to him, *also* conclude that they are natural kinds (though apparently this does not go both ways).[759]

John Dupré who, as we saw, is a pluralist regarding species concepts, is also a pluralist regarding ontologies.[760] As we noted in the beginning of this sub-section the idea that species are individuals fits very well with the role species play in evolutionary theory. Dupré argues, however, that for all other areas of biology, seeing species as individuals is not working very well. In ecology, for example, he believes that species have to be conceived of as kinds.[761] His conclusion is that species play different roles in different theories. If species have

[754] de Queiroz 1999 p.61, Sober 1993 p.15
[755] Buege 1997 p.2
[756] Callicott 1980 pp.320ff, Johnson 1991 pp.153f, Rolston 1988 p.149
[757] Boyd 1999 p.168, Griffiths 1999 p.211, Hull 1999 pp.32f, Wilson, Robert A. 1999:1 pp.188,191
[758] Boyd 1999 pp.141, 162f
[759] Boyd 1999 p.141
[760] Dupré 1993 p.43
[761] Dupré 1993 p.20

to be conceived of as individuals in evolutionary theory, we must conclude that species *are* individuals in that context, but that they are other things in other contexts.[762] He argues that just like the cells in his body can be both members of a kind (the cell-kind) and parts of an individual (the organism), so organisms ought to be able to be both members of species that exist in the form of kinds, and parts of species that exist in the form of individuals.[763]

From an ecocentric perspective, ontological pluralism presents the same problems as pluralism regarding species concepts: If all species can be seen as existing in both ways depending on perspective, it is not obvious that it is possible to maintain the realism that is originally built into the two ontologies. On the other hand, if different species exist in different ways, the ecocentrists will have to find more than one way of assigning moral status to species in order to cover all species. If finally, as Dupré seems to argue, all species actually exist in more than one sense simultaneously, ontological pluralism looks like a good option for Rolston.

There is one problem, however: It is very important for both Rolston and Johnson that species play the role of individuals not just in evolution but also in the ecosystem. This will not be possible if Dupré is right.

As we also saw before, Callicott seems to believe that the idea of species as classes is the predominant theory, and he was very cautious in his reference to Hull. Even so, when he argues for his own theory he clearly assumes that species *are* individuals.[764] He uses this ontology, not only to argue for moral duties to species,[765] but also as a basis for claiming that it is acceptable to sacrifice organisms for the good of species or ecosystems. [766] He reminds us that we sometimes sacrifice parts of a person for the good of the person as a whole, and he argues that we ought to do the same with parts of species even if these parts are sentient organisms.[767] This seems to follow our conclusion above that the idea of species as individuals strengthens the instrumental value but weakens the moral standing of individuals in relation to species.

Also others, both supporters and opponents of ecocentrism, have concluded that the idea of species as individuals is essential for the idea of species as moral objects.[768] Tom Regan, who is one of the fiercest opponents to ecocentrism, believes that the faith of ecocentrism is closely connected to the question of whether species are individuals. Contrary to both the ecocentrists and a number of other philosophers and biologists, he does not believe that species are individuals, however, and he sees this as an important argument against ecocentrism.[769]

According to Regan:

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[762] Dupré 1993 pp.42f
[763] Dupré 1993 p.58
[764] Callicott 1980 pp.321ff
[765] Callicott 1980 p.322
[766] Callicott 1980 pp.320, 322f
[767] Callicott 1980 p.323
[768] Buege 1997 passim, Regan, Tom 1983 pp.245f, 359, 362, Schönfeld 1992 p.360
[769] Regan, Tom 1983 pp.245f, 359, 362

> The rights view is a view about the moral rights of individuals. Species are not individuals, and the rights view does not recognize the moral rights of species to anything, including survival.[770]

Even though the idea of species as individuals has become quite popular, Regan is far from alone in being critical. There are a number of other critics,[771] and there are a number of problems of which some are quite severe.

The big question is whether there is not more to being an individual than spatiotemporal boundness. At least some authors argue that there is, though they do not agree on whether this is a problem for the idea that species are individuals.

Sober argues that a particular kind of causal connection between the parts is necessary for something to be properly called an individual.[772] Ereshefsky argues for both cohesiveness and a causal connection,[773] and Horvath argues for cohesiveness and integration in relation to the evolutionary forces that work on them.[774] Robert A. Wilson argues that the difference between individuals and kinds is that the former, contrary to the latter apart from spatiotemporal unity, also have internal coherence, discrete boundaries, and a historical continuity,[775]while Bradley E. Wilson talks about internal organization and cohesion.[776]

Cohesion, organization and integration seem to be popular criteria. The question is how these demands should be interpreted, and especially how they can be interpreted in such a way that they put species ontologically on par with organisms. The main point seems to be that the connection between the parts has to be both strong enough and of the right kind. We have seen that species might not be universal enough to be natural kinds, but are they bound enough to be individuals? It might just be that the spatiotemporal boundness of species makes them too cohesive to be kinds, but not cohesive enough to be individuals.

Ereshefsky suggests that actual interbreeding is both necessary and sufficient to fulfil his criteria, but he also points out that only populations that count as species according to the strongest version of the biological species concept would then qualify as individuals.[777] For ecocentrism this would mean that their realm of moral objects would be severely restricted, and most of what they call species would not qualify as individuals.

Even if we weaken the criteria so that all populations that count as species according to the more conventional version of the biological species concept are seen as individuals, we would still have to exclude all non-sexually reproductive species. Besides, it is very doubtful that a potential to reproduce sexually can

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[770] Regan, Tom 1983 p.359
[771] Boyd 1999 pp.168, 173, Dupré 1999 p.18, Ereshefsky 1991 p.96
[772] Sober 1993 p.150
[773] Ereshefsky 1991 pp.96f
[774] Horvath 1997 p.227
[775] Wilson, Robert A. 1999:1 p.191
[776] Wilson, Bradley E. 1995 p.340
[777] Ereshefsky 1991 p.98

really be enough of a connection between organisms to conceive of the species as an individual.

If we instead decide that historical continuity is what it takes to be an individual we would include all species according to the phylogenetic species concept. This would also take us closer to how we tend to look at individual persons. Historical continuity is often seen as necessary for personal identity among persons, but is it enough to define someone or something as an individual? When we discussed the phylogenetic species concept we saw that one problem is to find cut-off points between lineages that is good enough to work as species boundaries, and we did not find any satisfying solution to that problem. Seeing species as individuals will clearly not lessen the demands on what constitutes a good cut-off point. This is a problem considering that if we look at individual organisms (who are seen as the paradigm cases of individuals), it is in general very simple to distinguish between individual organisms even if they are historically connected. It is in general unproblematic to distinguish between an individual organism and its siblings, parents or offspring. A possible explanation for this is that individual organisms are internally physically united while physically clearly distinct from the surrounding world. Does this mean that internal physical unity and external physical isolation are necessary to be an individual?

There are two obvious exceptions to the rule that individual organisms are physically isolated. Before a mammal is born and the umbilical cord is cut, it is not totally physically separate from its mother. The other case is Siamese twins. They count as different individuals although they are physically connected. In these cases we may be able to circumvent the problem by saying that not all parts of an individual must be separated from all parts of another organism. The important thing is that certain relevant parts are isolated from each other. In our case it ought to be the brain as the physical basis of our personality. For organisms that do not have a brain, maybe the reproductive organs would be used as the identifying physical part. The point is that even when we distinguish between individual organisms that are partly physically united, we still seem to use some form of physical isolation to decide whether we deal with one or two individuals, and it seems to be intuitively very clear which physical parts have to be isolated from each other.

However, to use *relevant physical isolation* as the cut-off point between individuals does not seem to make any sense if the entities in question are not to some degree internally physically connected. The fact that there is often (at least) as much physical isolation between organisms belonging to the same species as there is between organisms belonging to different species means that we will never be able to use physical isolation to distinguish between species. The lack of physical connectedness within species also seems to be a problem in itself. Intuitively, close physical connection is probably the first thing that comes to mind when it comes to identifying something as an individual.

At least this is true for many forms of individuals like individual organisms, individual pens, individual books etc, but we also tend to talk about individual

universities, individual companies, individual countries, etc. and they are not always internally physically connected. Callicott makes an analogy between species and human societies,[778] and Ghiselin has compared species to companies.[779] Both Ghiselin and Sober have also pointed out that we conceive of USA as an individual country even though Alaska is not physically united with the other states.[780]

These are good points. We do tend to see countries as ontological individuals and they certainly play the role of individuals on the international arena. It is also clearly the case that at least some parts of countries sometimes are at least as physically disconnected as those of species. In the same way, companies play the role of individuals in the economic arena and many companies are spread all over the world. The same seems to be true (in their respective arenas) of universities and many other kinds of organisations.

What keeps countries together seems instead to be things like common laws, a common economy and a common government that has some kind of control over the entire territory. When we talk about organisations and companies, the answer seems to go along the same lines. Both organisations and companies have a board, they have statutes, and they have a common economy. Individual organisms have a common system for collecting and digesting nutrients and some organisms have a brain connected to a nervous system that controls the entire organism. It might thus be that it is the way the parts are organised and the way they interact rather than simply their physical connectedness that are relevant for deciding whether something is an individual. We can, for the sake of simplicity, say that what is relevant is the way the parts *cooperate*.[781]

If we look at our examples above regarding mothers/foetuses (or newborns connected with the mothers by an umbilical cord) and Siamese twins respectively, we concluded that they are distinguishable because it is possible to identify some relevant parts of the individuals that were not physically connected. Maybe that conclusion was premature? Maybe the real explanation is that they are distinguishable because they do not cooperate in some relevant respects?

Apparently it is not always the same kind of organisation and interaction between the parts that keeps individuals together, and sometimes there might be more than one type of organisation and interaction within the same individual. In individuals, like organisms, it might even be that some parts cooperate for one function and other parts cooperate for something else, and the whole complex of co-operations bind all parts together even if not all parts cooperate with all other parts.

How about very simple things like individual tables or coins? In these cases, the cooperation is not very sophisticated but it seems intuitively reasonable

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[778] Callicott 1980 pp.321f
[779] Ghiselin 1974 pp.536, 538f
[780] Ghiselin 1974 p.536, Sober 1993 p.150. One might add that the same is true for Hawaii.
[781] 'Cooperate' is here used in a sense that does not imply sentience, intentionality or goal direction.

to talk about atoms held together and organised in a certain way as a very close form of cooperation.

Do species have enough co-operation, in this sense, among its organisms to count as individuals according to this criterion? Some populations, like a community of ants, seem like clear candidates. Hunting wolf packs are much less clear candidates, while I am very hesitant to count populations where the most substantial form of cooperation is in the form of actual interbreeding, as real candidates. Populations with even weaker connections between the organisms must be deemed to be well outside of what can reasonably be called cooperation even in our technical sense of the word.

It therefore seems that if we decide that cooperation of the kind we find between the parts of organisms, physical objects and human societies and organisations is necessary to constitute an individual, then species can with a few exceptions not be conceived of as individuals. In some cases it even seems to point out other levels than species, such as ant colonies and possibly packs, as individuals.

If we instead use a weaker set of criteria as sufficient for calling something an individual, we will not be able to say that species are individuals in the same sense as individual organisms. This still means that species can satisfyingly play the role of individuals in a weaker sense in, for example, evolution. It will however deprive the ecocentrists of the possibility of saying that species have the same ontological status as individual organisms.

6.1.9. Species as lineages

An alternative way of conceiving of species is to see them as segments of historical lineages. A historical lineage is, according to Bradley E. Wilson, "a sequence of reproducing entities, individuated in terms of its components".[782] Kevin de Queiroz describes it as "a single line of direct ancestry and descent".[783] A species is then a properly chosen segment of a historical lineage. The explanation to why it must be a segment and not a whole historic lineage is that species otherwise would be absurdly large. In fact, all organisms descend from the same RNA-molecule, which means that if we talked about whole historic lineages as species, all organisms would belong to the same species.[784] Not any segment can count as a species, however. There is no consensus about how the segments should be cut, but for de Queiroz it is important that a segment that counts as a species has a demarcation line created by some critical event.[785]

[782] Wilson, Bradley E. 1995 p.339
[783] de Queiroz 1999 p.50
[784] When I use the term 'lineage' I will therefore use it as short for 'segment of historical lineage'.
[785] de Queiroz 1999 p.53

The lineage idea is often seen as part of the idea that species are individuals but it has also been proposed as an independent ontology. Both de Queiroz and Bradley E. Wilson believe that the idea of species as segments of historical lineages (or for short – lineages) can be seen as an argument that species are individuals.[786] Wilson also believes, however, that by only seeing species as lineages we can avoid the problems that follow with the notion of species as individuals.[787]

This seems to be true about the most important problem we found in connection with the idea of species as individuals. By seeing species as lineages but not as individuals we do not have to claim that all organisms of a species are organised and interact in the same way as parts of an individual organism, organisation, country, etc. The only thing we have to maintain regarding the organisms belonging to the same lineage is that they share the same descendant or are descendants of each other.

Another benefit of the term 'historical lineage' over the term 'individual' is that the former is less prone to misuse and misunderstanding. The paradigm cases of moral objects are organisms. If we see species as individuals in a way that is very different from the way in which organisms are individuals without being very clear about the differences, we run the risk that species are also regarded as organisms in a morally relevant sense. We would therefore also risk that what looks like a victory for ecocentrism turns out to be a simple linguistic shift of meaning.

A major advantage of the lineage idea is, according to de Queiroz, that it fits with all species concepts. He claims that all species concepts actually assume that species are segments of lineages. Seeing species as lineages is, in his view, the one thing that all species concepts have in common.[788] What distinguishes the different species concepts is, according to him, just how the segments are cut.[789]

During my investigation of species concepts and ontologies I have found that many of the authors on the subject do, at least occasionally, talk about species as lineages independently of what concept or ontology they defend.[790] This seems to support de Queiroz's claim. My investigation has, however, been very limited and there are others who have reached other conclusions. Thomas Reydon has consulted a number of overviews of species concepts, and concluded that only a minority of them see species as lineages or segments of lineages.[791]

I do not believe that the question of whether most of the proponents of different species concepts talk about them as lineages is a conclusive argument in either direction, however. The really interesting question is whether species,

[786] de Queiroz 1999 p.67, Wilson, Bradley E. 1995 p.339
[787] Wilson, Bradley E. 1995 pp.339, 341, 353f, passim
[788] de Queiroz 1999 pp.49, 60ff, 79. Horvath also claims that all taxa are lineages (Horvath 1997 p.228).
[789] de Queiroz 1999 p.53. At one point, Dupré argues along the same lines (Dupré 1999 p.10).
[790] See e.g. Donoghue 1985 p.179, Dupré 1999 p.10, Ereshefsky 1991 pp.86ff, Hull 1999 p.41, Mishler 1999 p.313, Horvath 1997 pp.226, 228, Rolston 1988 p.149, Rolston 1994 p.36, Rolston 1999 p.123, Sober 1993 pp.155f, Sokal 1973 p.363, Sterelny 1999 pp.120, 123
[791] Reydon 2005 p.141

according to all the serious contenders among species concepts, can be seen as lineages.

That phylogenetic species can be seen as existing in the form of historical lineages is quite clear.[792] Seeing species as segments of historical lineages is in fact a perfect fit for the phylogenetic species concept.

According to de Queiroz, the biological species concept can also be fitted into this ontology because interbreeding populations can be seen as "time-limited" segments of historical lineages.[793]

This might work as long as we have reasonably strong criteria for what counts as an interbreeding population, and as long as we do not use too restrictive time limits. To talk about a historical lineage of one generation seems absurd.

The really troublesome case ought to be the phenetic species concept. It is not easy to see a species defined by common properties as a lineage the way lineages have been defined by de Queiroz and Bradley E. Wilson. Nothing guarantees that organisms with the same defining set of properties belong to the same segment of historical lineage.

On the other hand, belonging to the same lineage can, in itself, be seen as a property even though this probably is quite far from the kind of properties that the proponents of phenetics traditionally have had in mind. Even so, this is how de Queiroz chooses to argue. If we instead see properties other than belonging to the same lineage segment as just contingent properties instead of necessary criteria, and concentrate on the species as lineage segments, the species problem will, according to him, disappear.[794]

By maintaining that there is one property (being a segment of a certain historical lineage) that is unique for the species category and that defines all species as species, de Queiroz can maintain that species exist objectively as segments of lineages, but that different segments can be identified as species based on different contingent properties.[795]

As an effect of this, he also believes that the lineage concept can account for both monism and pluralism. It allows for pluralism in the details but has a monistic basis – the lineage. Thereby he argues that the conflict between monism and pluralism disappears.[796]

As I interpret him, all species exist in the form of lineages, but the lineages are cut off from other lineages in different ways. Some species – i.e. some lineage segments – are distinguished by their ecologic niche while other species are distinguished by intrinsic reproductive isolation, etc.

One writer who opposes the suggestion that lineages can be an ontological category, is Walter Bock. He claims that those who see species as lineages have conflated two distinct concepts, viz. representations and ontologies. According to

[792] Wilson, Robert A. 1999:1 p.192
[793] de Queiroz 1999 p.54
[794] de Queiroz 1999 pp.75, 79
[795] de Queiroz 1999 p.75
[796] de Queiroz 1999 p.73

Bock, lineages are representations of a species history and do not really exist in nature.[797]

I believe it does make sense to see lineages as a representation of a species history. On the other hand, I do not see that it *only* has to be a representation. We usually talk about human family lines as something that actually exist even though some or most of the human individuals who make up the family line are dead. It is true that we also say that a family line is dead when all members of that line are dead, but that does not contradict the previous statement. In fact, if we reason in the same way about species as lineages, it will solve one of the problems that haunted the ideas of species as classes and species as natural kinds, viz. that classes and natural kinds cannot really be exterminated even if all their members disappear. In order to talk about extinction we need an ontology that allows species to go extinct. We saw that the notion of species as individuals allowed that, and it seems that species as lineages also allows for it, which clearly talks in favour of this idea from an ecocentric perspective.

The only ecocentrist who explicitly talks about species as lineages is Rolston, and he does it rather often.[798] On the other hand, we have also seen that he talks about species both as natural kinds and as individuals.

Once again, it might be possible to conceive of species as both kinds and individuals, but doing so makes things more complicated for the ecocentrists. Here we have seen that the idea of species as lineages is often used to support the idea of species as individuals, but that the best use of the idea that species are lineages might be an alternative to the idea of species as individuals. De Queiroz does not mention natural kinds but he claims that seeing species as lineages can be used to reconcile the idea of species as individuals with the idea of species as classes. His way of doing so takes the form of extracting lineages as the real ontology. However, doing this with classes leads to a problem. It implies that we see species as "the class or set of organisms that make up a particular population-level lineage segment".[799] In this way, de Queiroz admits, classes will be spatiotemporally restricted which is not normally how they are conceived of in the classes/individuals debate.[800] If we try the same manoeuvre with natural kinds we get the same result, and considering the central role the question of spatiotemporal restrictedness plays in the debate between the ideas of species as natural kinds and species as individuals, this is probably a very serious problem.

Rolston only briefly states in one passage how he sees the relation between lineages and natural kinds. He explains that "species are the actual historical lineages through which the natural kinds travel through time".[801] He does not expand on what he means by this but it looks like he means that species are actually historical lineages while natural kinds are something else that move along the lineages. He does not give us any hint what the natural kinds that move

[797] Bock 2004 p.179
[798] Rolston 1988 p.149, Rolston 1994 p.36, Rolston 1999 p.123
[799] de Queiroz 1999 p.67
[800] de Queiroz 1999 pp.67f
[801] Rolston 1994 p.36

along the lineages consist of, however. Considering that he in other places, clearly states that species are natural kinds, the statement above is quite confusing. If he means that species are both lineages and natural kinds, we have to ask why and how do species move through species?

What would Rolston and his colleagues say about dropping the other ontologies and just seeing species as lineages? It would make things much easier, and we would avoid the quite severe problems we have found in the other ontologies. The only draw back would be that it is intuitively less obvious that a lineage can be a moral object than that an individual can. However, as we saw above, this intuition can turn out to be an illusion based on a shift of meaning since we have found that the only way of conceiving of species as individuals is to accept a very different notion of 'individual' than we use when we talk about organisms as individuals. It might therefore instead be an advantage for the ecocentrists to have a "clean" terminology that lets them prove their point without any shift of meaning. All in all, it seems that seeing species as segments of historical lineages is the best bet for the ecocentrists.

6.1.10. The demarcation problem

A problem that is common to all the species concepts and ontologies is that it is not easy to find a natural place to draw the borderline between different species. For example, Wilkerson argues that even though species are useful tools "for field biologists, gardeners and zoo keepers", the idea of dividing living nature into discrete entities with clear boundaries between them might not be a very good model of nature where discrete boundaries do not exist.[802] Mishler argues along the same lines,[803] and Richard Dawkins has described species as

> an arbitrary stretch of a continuously flowing river, with no particular reason to draw lines delimiting its beginning and end.[804]

This is, of course, a rather incisive way of putting it, but it is a pedagogically effective picture of our problem. The problem looks slightly different for different species concepts and for different ontologies depending on how they conceive of species, but they all experience it in some form.[805]

The phenetic species concept has to deal with individual variations that make it difficult to decide which and how large differences should count as constituting the border between species. It is rare that all organisms of a species

[802] Wilkerson 1993 p.8
[803] Mishler 1999 pp.308f
[804] Dawkins 1991 p.264
[805] Mishler 1999 pp.308f

have a particular property and all other organisms do not. Often it is a matter of degree. Different organisms have more or less of the property or properties in question, and some properties gradually transcend into other properties. In some cases, the variation is as large or larger within as between species.

The biological species concept has the problem that populations are not always perfectly isolated.[806] Hybridisation is in some cases rather common – especially among fishes, amphibians, and above all, among plants.[807] In some areas of the plant kingdom, the confusion is quite compact. In the genera *rubus*, for example, there are no sharp discontinuities, and there is no real consensus about how to divide it into species.[808] Reproductive isolation is not always absolute. Just as with phenetic species, the border between interbreeding populations is often a grey area rather than a clear line.

Sterelny and Sober argue that we can use external isolation to draw sharp lines between species.[809] As Sterelny points out, isolation of populations can occur relatively instantaneous as a result of changes in the environment, even if the transition of internal properties is slow and gradual.[810]

A serious problem with this solution is that it is only valid for the version of the biological species concept that accepts external barriers as borders between species, and as we saw above, this version is particularly troublesome both in general and for ecocentrism.

The phylogenetic species concept is burdened by the fact that we are all related. Any two organisms have a common ancestor if we go far enough back in time. This means that it is possible to identify monophyletic groups of any size. How inclusive a species is therefore depends on where we choose to draw the line. This means that the phylogenetic species concept has two demarcation problems: Both the problem of drawing the line between different species, and the problem of drawing the line between species and other taxa.

These problems also affect the different ontologies. If species are classes or kinds, there are always organisms that can equally be easy sorted into more than one class or kind and as a result of the unclear borders between the species, the borders between the classes or kinds will be equally unclear. If species are segments of lineages (whether the lineages should be seen as individuals or not) we have to decide where to cut the lineages into segments. Evolutionary lineages can be divided into species in different ways,[811] and there is an ongoing debate about when two population lineages should be seen as distinct species.[812]

Because of these problems, there is a pressing concern that the borderlines we draw between species might not always – or even at all – reflect something that exists independently of us. The borders might be drawn based on other

[806] Dupré 1999 p.6
[807] Dupré 1993 p.56
[808] Dupré 1999 p.8
[809] Sober 1993 p.148, Sterelny 1999 p.129
[810] Sterelny 1999 p.129
[811] Horvath 1997 p.228, Sterelny 1999 p.120
[812] de Queiroz 1999 pp.57ff

considerations such as what we choose to concentrate on, or just on what happens to be convenient.[813]

This is, of course, most serious for the idea that species are individuals, but it is also troublesome for the notions of species as classes or kinds. Probably more for kinds than for classes because of the role natural kinds are supposed to play in natural laws, and because natural kinds are defined as existing independently of us. For those who see species as segments of historical lineages it is possible to maintain that the historical lineages exist objectively even though the borders between the segments are unclear or based on subjective criteria.

For the ecocentrists this can hardly be enough, however. Many ecocentrists have been worried about the demarcation question – and for good reasons, I believe. If the border between species is unclear or decided by us rather than by nature, it will be more difficult to claim that any duty to, for example, preserve a particular segment or kind is a duty *to* the segment or the kind rather than a duty to human beings. It will also make it much more difficult to make sense of the idea that species have interests qua species and independent of our interests. The vagueness of the borders is also problematic for ecocentrism in another way. When ecocentrists claim that species have an interest in existing, they talk about interests had by the "individual" species. It is not a matter of a general interest had by nature or by the whole historical lineage of life. The idea is instead that each species has an interest in its own survival. This means that the interests emerging from the species are supposed to be discrete units with discrete sources and goals. It is very difficult to imagine how this can be the case if the species are arbitrary stretches of a continuously flowing river.

The demarcation problem thus means both that it is difficult to maintain that species have an independent objective existence – which seems to be necessary in order to maintain that their interests are independent of us – and that they are independent of each other to such an extent that each species can have its own self regarding interests isolated from the interests of other species.

Ben Bradley even believes that it is difficult to attribute intrinsic value to species because of what he sees as an arbitrariness of their boundaries.[814] Whether that is the case depends on what we mean by 'intrinsic value'. If we just mean 'moral standing', than he is clearly right due to the problems I have sketched above. If we by 'intrinsic value' mean 'valued as an end in itself by a sentient valuer' I am not sure that he is right, however. If we decide the borders between species based on criteria that we find relevant, I do not see why we cannot assign end value to the resulting species even if the borders are either in the form of a grey area or in the form of a line drawn by us through a grey area. It might mean that our interest in the species gets weaker when we deal with organisms that belong to the grey area, or it might mean that our interest is enhanced in the form of fascination for nature's "unwillingness" to be easily divided into discrete units. The vagueness of the borders can thus give species more or less end value depending on the attitude of the valuer, but it does not

[813] Boyd 1999 p.173
[814] Bradley 2001 p.47

show that it is impossible to value the stretch of life that we have picked out and designated species status to as an end in itself.

Among the ecocentrists, Callicott concludes that the ontological status of species is sufficient to assign intrinsic value to species, but not enough to talk about species rights.[815] Both Rolston and Johnson argue that species are discrete enough to have duty-generating interests (none of them talk in terms of rights).

In spite of all the problems, some authors claim that there are as a matter of fact sharp discontinuities between species.[816] Admittedly, it is quite easy in most everyday situations to distinguish between different species, at least as long as we stick to the big mammals and birds that we tend to think of when we talk about species.[817] When we talk about other species and particularly about plants, it will, as we saw above, be much more complicated. Even when we talk about "easy" species in this respect it is only easy as long as we stick to contemporary life. Historically, all species fade into each other.[818] Evolution is still going on in nature and the speciation process happens right under our noses. Even species that we can easily distinguish between today have common ancestors and the question remains where we should draw the borderline. The species borders are therefore, as Dawkins puts it, "definable only because the awkward intermediates are dead."[819]

A possible solution to this problem is to limit ourselves to talk about the now living individuals and possibly the fossils we have managed to find and identify, while we ignore the rest. It seems to be good enough for most everyday situations, and Dawkins himself claims that given the information we have, it is possible to find one correct taxonomy, even though it is only correct as long we do not have a complete fossil record.[820]

Species do not only change gradually through history, however. There is also gradual change around the earth. Some species are spread all the way around the globe but each local population is a little different from its neighbour populations. The differences are not big enough to prevent interbreeding – except at one point where the differences are too large. This means that population 1 can interbreed with population 2 and is therefore the same species, population 2 can interbreed with population 3 and they are therefore the same species, and so on around the earth until we are back where we started and population N meets population 1 with which it cannot interbreed.[821] The question is: Is this one or two (or more) species? In the area where both population 1 and population N exist the populations count as two species but everywhere else around the globe it is only one species. Ring species are rare but they do exist and they show us that gradual change, not just historically but also geographically, is a problem

[815] Callicott 1986 pp.143ff
[816] Donoghue 1985 p.173, Dupré 1999 p.5, Sterelny 1999 p.119
[817] Sterelny 1999 p.119
[818] Sterelny 1999 p.120
[819] Dawkins 1991 p.264
[820] Dawkins 1991 pp.258ff
[821] Dupré 1993 p.56

both for our efforts to find a way to distinguish between species, and for the question of their ontological status.

Ignoring history does therefore not solve the entire problem with gradual change – just one dimension of it. Even though it is the dimension that contains most of the problematic cases, it is not satisfying to leave the remaining cases unattended.

A view of species that only works in the absence of some facts also looks like a rather unappealing solution for ecocentrism. It is difficult to see how species can play the role they are assigned by ecocentrism if the borders between them can only be upheld as long as we lack (or ignore) parts of their history.

On the other hand, accepting that there are no clearly distinguishable borders between species does not look like a good option either. Species may be able to play their assigned roles in ecology, evolutionary theory, palaeontology, etc. without being discrete entities, but how can each species have its own interest if the species are not discrete entities, or at least have a core that is clearly *it*?

Dupré sees the idea of clearly defined discrete species as a remnant from the creationist view of biology,[822] and he believes that it is no longer reasonable to assume that evolution has produced discrete species.[823] Eugene Hargrove even concedes that the old pre-Darwinian – view that species were created in their present shape and are fixed once and for all would be a stronger foundation for species protection than the evolutionary theory.[824] This does not mean that he is willing to accept a pre-Darwinian view, but that he acknowledges the problem that an ongoing evolution creates for ecocentrism. Of course, ongoing evolution is a fact and if that is a problem for ecocentrism, then ecocentrism is in big trouble.

Lawrence Johnson mentions the idea of punctuated equilibrium as a possible solution.[825] The punctuated equilibrium-theory states that evolution works in sudden leaps rather than at an even pace.[826] If this is correct, it will mitigate the problem by providing us with evolutionary gaps that can be used as natural demarcations between species. Both Johnson and Dawkins note that it would be much easier to see species as discrete entities if we accept punctuated equilibrium, compared to a more gradualist view of evolution.[827]

However, punctuated equilibrium is still a controversial theory. David Resnik argues that it is an ad hoc theory and that there is no independent evidence that evolution has proceeded with different speeds at different times.[828] Also, Johnson and Dawkins are unconvinced by the idea of punctuationism. Even though Johnson mentions it as a possible saviour of his theory, he does not argue for it. Instead, he concedes that he is rather sceptical and leans more in the

[822] Dupré 1999 p.12
[823] Dupré 1999 p.12
[824] Hargrove 1987 p.17
[825] Johnson 1992 p.147
[826] Eldredge & Gould 1972 passim
[827] Dawkins 1991 p.264, Johnson 1992 pp.147f
[828] Resnik 1994.p.6

direction of gradualism.[829] Dawkins is even more sceptical. He points out that even though punctuated equilibrium assumes that there have been short periods of very rapid development and long periods with slow or no development, it is still a gradual evolution when we get down in detail. The steps are just not dramatic enough to give us the gaps we need. They just make it more unlikely for us to retrieve a complete fossil record, and thereby make it easier for palaeontologists especially to maintain their taxonomic groups.[830] According to Dawkins, no one really believes that

> there really was a first human, whose mutant brain was twice the size of his father's brain and that of his chimp-like brother.[831]

In other words, punctuated equilibrium might not be able help us find the clear natural borders we need, and even if it does in some cases, not all species have come into existence in that way, so the ecocentrists would still need another way of distinguishing between remaining species.

An alternative way of dealing with the demarcation problem is to admit the vagueness but deny that this causes the problems I sketched above. This strategy is ultimately chosen by both Johnson and Rolston. Rolston admits that the edges of species are "sometimes fuzzy", and that species "slide into another over evolutionary time", but he denies that this means that they do not objectively exist.[832] Johnson argues that it is not necessary for his theory that species have precise boundaries.[833]

Some writers have dealt with this problem by using analogies. Ereshefsky makes an analogy with baldness. The border between being bald and not is far from clear but that does not stop us from saying that there are bald people and there are people who are not bald.[834] Other authors have referred to height. It is not possible to say exactly where to draw the line between being tall and being short, but we can still agree that there objectively exist tall people and short people. Johnson has compared the "fuzziness" of species borders with the planet Jupiter, which is primarily made up of lightweight gases,[835] and therefore does not have any exact boundaries. Still, no one hesitates to call Jupiter an objectively existing discrete entity.[836]

These seem like good analogies, though there are some problems. Even though the borderlines of Jupiter as well as of many other celestial bodies are somewhat "fuzzy", they still have a core that is clearly "planet". The same does not seem to be the case with species. A species is made up of individual organisms that are clearly separate (Johnson has to agree about that since he also

[829] Johnson 1992 pp.147f
[830] Dawkins 1991 p.264
[831] Dawkins 1991 p.264
[832] Rolston 1988 p.136
[833] Johnson 1992 p.149
[834] Ereshefsky 1991 p.95
[835] Kaufmann 1994 p.229
[836] Johnson 1992 p.149

uses an analogy with organisms that he sees as obvious examples of discrete entities). When we talk about baldness or tallness it does not seem to matter that many people are "a little bald" or neither tall nor short. When we divide organisms into species we need to be more stringent, however. It is generally held that each and every organism belongs to one and only one species. This means that if we just accept that the species borders are unclear we will in many cases have to make a decision that has no basis in nature. We will therefore again have to question the independent existence of species. When we talk about tallness/shortness or baldness/non-baldness we do not have to do that. We can admit that the borders are unclear, and that many people are not clearly one or the other. We therefore do not have to impose borders that are not there. In the case of tallness/shortness and baldness/non-baldness we are also dealing with two extremes. It is easy to identify the extreme points on a one-dimensional scale even if it is not easy to say when we should stop talking about one extreme and start talking about the other. When we talk about species we are dealing with many segments on a many dimensional scale, and it is not even obvious how many segments we should divide the scale into. The most important difference between the analogies and species is that we need species to have interests. Even if the analogies we have seen here would be enough to grant that species have independent objective existence, we have not come any closer to showing that species with unclear borders still can have discrete self-regarding interests.

Analogies have also been made with individual organisms. If we could show that individual organisms have unclear borders in the same way as species do, we would have a good case for arguing that it is possible to be a moral object even with unclear borders.

Both Johnson and Rolston have made this analogy. Rolston claims that "taxonomists can often distinguish between two species more readily than between two individuals within a species",[837] while Johnson points out that both the spatial and the temporal borders of organisms are "fuzzy".[838]

Rolston's exclamation is a clear exaggeration, although it is true that the borders of individual organisms are not totally clear. If we start with the temporal borders, it is not totally obvious when a new organism comes to be. It is easier for sexually reproducing organisms than for organisms who reproduce by fission, but even for sexually reproducing animals it is not easy. Does the organism come into existence at the moment of conception, the moment of birth or some time in between? In fact, even the "moment" of conception is not really a moment but something that gradually progresses.[839] Also the moment of death is not totally clear. There are different ideas of when someone is to count as dead, and the dying is, in some cases, a rather extended process.[840]

[837] Rolston 1988 p.151
[838] Johnson 1992 p.149
[839] Sober 1993 p.151
[840] Johnson 1992 p.149, Sober 1993 pp.151f

When it comes to the spatial borders, they seem rather clear as long as we talk about animals,[841] but for some life forms it is not totally clear what should count as one organism. When we talk about plants it can sometimes be quite tricky. Sober has pointed out that a stand of aspens connected by underground runners may or may not be seen as the same organism.[842] When we talk about more "primitive" organisms it is sometimes even more difficult. According to de Queiroz, the difficulties of determining the number of and exact boundaries between individual organisms of some species is not considered a problem for the organism concept, so it should not be a problem when we talk about species.[843] Ciliates are an example where it is rather confusing to try to determine the number of, or exact boundaries between, individual organisms.[844]

Johnson also points out that as living organisms we undergo "radical changes during our lifetime."[845] This is true. The same individual can have very different appearances at different times. It is true even of human beings, and it is even truer of for example insects who go through very different life stages. Even so, it does not really cut to the point. Even though one individual can go through different stages in life that are quite different, there is no problem to point it out as being the same individual – at least not if you have followed it closely trough its history. With species it is the other way around. It becomes *more* difficult, not *less*, to identify species if you follow them closely through their history.

A general problem with these analogies is that even if the borders of organisms are somewhat "fuzzy", they are decidedly less "fuzzy" than the borders between species. An important difference is also that we have a core that is obviously "us". The same does not seem to be the case with species. The individual members of a species are sometimes scattered around the whole planet, and it is therefore difficult to conceive of a species as having a spatial core. It is the same problem when we talk about the time dimension. Even if the exact times for the beginning and the end of an organism's existence may be argued about, for most of its lifetime it is quite clear that this is one organism. It is therefore not really comparable with the problem of when one species begins and another ends.

What is even more important is that when we talk about what it takes to be a moral object, we have to remember that the competing theories that we are investigating (anthropocentrism and sentientism) only endow moral status to animals that are clearly distinguishable – as human beings in the case of anthropocentrism and sentient organisms in the case of sentientism. This means that even if there are organisms, like single-cell organisms or some plants that can be compared with species in terms of "fuzziness", species are still a long way from the distinctness of organisms that are normally seen as moral objects.[846]

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[841] There are exceptions, however. An ant or a termite stack might be seen as one individual.
[842] Sober 1993 p.151 On the other hand, Sober also argues that for sexual organisms the border between an organism and its offspring is precise.
[843] de Queiroz 1999 p.79
[844] Nanney 1999 pp.95, 97
[845] Johnson 1992 p.149
[846] de Queiroz 1999 p.79

The result seems to be that the difficulty of finding clear borders between many species causes more or less problems for all species concepts and ontologies. In spite of that, species can probably play the roles they are assigned in most sciences and everyday situations. It also seems possible to exist objectively with unclear borders. When we need clear borders it seems that we have to draw the lines based on our interests, however, which means that these borders will not exist independently of us. For ecocentrism this is a very big problem because if species do not have their own discrete self regarding interests it is difficult to see how we can have a moral duty to protect them *for their sake*.

6.2. In the interest of species

In order to have moral standing one must have interests for moral agents to consider. [847] In order for ecocentrism to make sense, species must have at least one interest: Continued existence. This is an absolute minimum requirement, which everyone involved in the debate seems to agree on.

The problem is that it is not clear in what sense species can be said to have interests. This is probably the most serious problem for ecocentrism, and it is also a problem that has been given much attention by both ecocentrists and their opponents.

Normally, only sentient beings are believed to have interests. Even if species are individuals in some sense, they are not *sentient* individuals. Therefore, it is very difficult to conceive of them as having interests in any morally relevant sense.

I will start this part of the investigation by trying to figure out why it is generally assumed that it is necessary to be sentient in order to have interests in a morally relevant way. After that I will look at how the ecocentrists try to refute some central pillars of this assumption, [848] i.e. that an ability to feel pain, experience things as good or bad, or have preferences is necessary in order to have interests in a morally relevant way. After having scrutinised these ideas and the ecocentrists' attempts to refute them I will investigate the ecocentrists' own suggestions in the form of biological wellbeing, self-definition, self-maintenance and goal-directedness.

[847] Some authors in this debate talk about 'rights' in a broad sense, apparently equivalent to the way I use the term 'moral standing'. Thus, having rights in their terminology is equivalent to having moral standing in mine. See e.g. Norton 1984 p.78f. In order to be as clear and as consistent as possible I will only talk about 'rights' in the more limited deontological sense of the word. Otherwise I will use the terms 'moral standing' or 'moral status'.

[848] Johnson 1992 passim, Westra 1997 p.294

6.2.1. The necessity of sentience

Why is it claimed that sentience is a necessary prerequisite to have interests in a morally relevant way? It is common to claim that it is, but few have presented any arguments for it other than intuitions. This, in a way, is understandable. The belief that sentience is necessary in order to have interests is very basic and very intuitive. The lack of arguments has however been pointed out by ecocentrists,[849] and led some of them to claim that the demand for sentience is either arbitrary,[850] or biased by the fact that human beings typically are sentient.[851]

There are, however, some philosophers who have supplied arguments for, or at least clues to, why sentience is necessary in order to have interests. Bennett Helm is one of them. He explains that "if someone were not affected emotionally by something no matter what happened to it, we would be hard pressed to say that it had import to her".[852]

This looks reasonable. Being affected emotionally seems like something that has a close connection with having interests. At least human beings tend to be emotionally involved in the things we have interests in. A problem with the word 'emotion' is that it is used in different ways by different authors. Some authors see emotions just as phenomena with no necessary connection to positive or negative evaluations,[853] while some use the word in a way that does not even imply sentience.[854] Perhaps 'feeling' or 'passion' would be better suited for the idea that Helm wants to promote.

No matter which of these terms we use, the advocates of ecocentrism would no doubt respond that the connection between interests and the phenomena in question looks reasonable to humans because humans are beings who have their interests connected to emotions (or passions or feelings), but that this does not prove that interests *have to* be connected to emotions (passions/feelings). To base our claims on the human case is just bias.

Johnson states that:

> Unlike the species, we human individuals are geared to feel about our interests, so it is hardly surprising that our interests are commonly tied to our feelings. Species however, our own included, are not organized in such a fashion.[855]

I believe, however, that Helm's point should be interpreted on a principal level that would avoid both these problems. Emotions/feelings/passions are important because it can be claimed that to have an interest in something is to care about it. In order to be able to care about something one has to be sentient.

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[849] Callicott 1985 p.372 note 8, Callicott 1980 p.315 note 13, Nelson 1993 p.249, Rodman 1977 p.89
[850] Callicott 1980 p.318 note 20, Nelson 1993 p.249, Rodman 1977 pp.90f
[851] Callicott 1980 p.318 note 20, Rodman 1977 pp.91, 93f, Rolston 1988 p.190
[852] Helm 2002 p.16
[853] Broom 1998 pp.371, 373, Pugmire 1998 pp.3, 8, 11ff, Öhman 2006 p.33
[854] See e.g. Öhman 2006 pp.39ff
[855] Johnson 1991 p.161

Therefore sentience is a necessary prerequisite for having interests in a morally relevant way.[856] Rick O'Neil for instance argues that

> … there is no reason to consider x's interests if x itself doesn't care about those interests. Why bother about an interest if it never has and never will concern or matter to the holder of the interest?[857]

To argue that someone has an interest she does not care about even seems contradictory. To claim that we have an obligation to consider an interest that no one cares about looks like a misuse of ethics. We might ask: If a species does not care about what we do to it why should we care?

I can, in fact, imagine several answers to that question. All of these answers will, however be in terms of the instrumental value or end value of the species for sentient organisms who do care. None of the answers will be in terms of the value the species has for itself, that is, none of them will be based on a respect for interests had by the species itself.

The advocates of ecocentrism do not, in general, claim that species care about what happens to them. Instead, they claim either that this demand too is a bias that begs the question in favour of consciousness,[858]or that there are other ways to have interests that do not require caring – at least not in "the familiar sense of 'care'" as Rolston puts it.[859] According to Rolston, the demand for sentience is a bias that

> takes a part for the whole … values a late product of the system, psychological life, and subordinates everything else to this. It mistakes a fruit for the whole plant, the last chapter for the whole story.[860]

The argument seems to be that sentience is not worthy of its special status, partly because it is a latecomer and partly because it is only one small aspect of the world and of the function of living entities. This argument seems to miss the point, however. The assumption that sentience is necessary in order to have interests is not a matter of assigning a special value to sentience. Whether sentience is worthy of any particular honour or fascination, or whether it has value as an end in itself is not what this discussion is about. Sentience is pointed out as a necessary prerequisite for having interests. Whether sentience is a good thing or not has nothing to do with this question. Even if we assume that sentience or being sentient is value neutral or even something bad, we still have to address the fact that by existing it gives those who possess it a point of view from which things are subjectively better or worse. The question is not whether

[856] See e.g. Samuelsson 2008 p.95 for some examples of authors expressing this view.
[857] O'Neil 1997 p.52
[858] Plumwood 1991 p.147
[859] Rolston 1999 p.124
[860] Rolston 1987 p.271, Rolston 1988 p.190

this makes them more or less valuable but of whether it makes other things, events, etc. valuable *for them*.

Johnson seems to admit that caring in some form is important: "An interest (or good) must in some way make some sort of a difference to whatever being has the interest".[861] Even so, he also believes that "it is question-begging to just assume that the being must be able to conceive of the interest (good) that makes the difference to it."[862] He argues that animals can act so as to promote an interest even if they do not conceive of it as an interest. We humans can, for example, promote our happiness without having happiness as the aim of our actions.[863]

Johnson has a point in that, but the point is misdirected. It is quite clear that we can promote our happiness without having it as our aim. It also seems correct to say that one can have an interest without conceiving of it as an interest. The problem for Johnson is that these facts do not have any bearing on the question of whether it is possible to have an interest without caring about the thing (state, event, etc.) that we have an interest in. In order to answer that question with a negation we have to show something more, viz. that something can be in someone's interest even if that someone does not have any subjective feelings for it. At least, this is how I interpret Helm's call for emotions, and it seems to be a reasonable demand.

The question of subjectivity is important here. Both since it clearly *requires sentience*, and because it seems to be clearly *required by interests*. Mark Bernstein uses the term 'subjective well-being', and he defines subjective well-being in terms of phenomenology: "On a subjective account of well being, an individual's doing well and doing poorly is constituted by the phenomenology that the individual experiences".[864]

However, that there is something phenomenological going on inside is not enough to have well-being in a relevant sense according to Bernstein. It is also necessary to be able to feel good or bad, i.e. to have what Bernstein calls a "hedonic dimension".[865] He also demands that the inner life of a moral patient is modifiable.[866] I suppose that by the last claim he means modifiable from the outside. If it is not modifiable from the outside, there is nothing we can do to make the entity in question better or worse off, and we can therefore not have any moral duties on its account. I believe this is something that everyone involved in the debate would agree on.

The other two demands by Bernstein also seem very plausible. It looks reasonable indeed to claim that being in someone's interest must have something to do with what is subjectively experienced as good by the possessor of the interest. To describe subjectivity in terms of phenomenological experiences

[861] Johnson 1991 p.127
[862] Johnson 1991 p.127
[863] Johnson 1991 pp.127f
[864] Bernstein 1998 p.39
[865] Bernstein 1998 p.40
[866] Bernstein 1998 p.40

seems intuitively reasonable, and to talk about a hedonic dimension seems to fit with Helms demand for emotions.

Joseph Levine's reasoning about consciousness seems to go roughly along the same lines. He explains the subjectivity of consciousness as meaning that there is something *it is like* to have conscious experiences while there is nothing *it is like* to be in an unconscious state.[867] I believe that this is a very important clue to the special status of consciousness. If something happens to a conscious experiencer there is something it is like for that individual to be subjected to the event in question. There is nothing it is like for a non-conscious entity to be subjected to anything. There is something it is like for me to be in pain. There is something it is like for you to be thirsty. There is, however, nothing it is like for a plant to be thirsty even though it reacts physiologically to that state, and there is nothing it is like for a species to be culled even if it affects its future evolution.

Dale Jamieson demands "a perspective from which their lives can go better or worse",[868] and Janna Thompson uses the having of a point of view as criteria for moral standing.[869] I believe these suggestions are synonymous, and they seem to provide a good summary of the ideas we have seen above. To say that something is in *your* interest must reasonably imply that it is good from *your perspective,* or *point of view*. Talking about a perspective or a point of view in turn must reasonably imply subjectivity. It also seems to imply that there is valuation involved – subjective valuation. All of this, in turn, clearly implies consciousness.

Michael Nelson admits that species do not have a point of view,[870] but he expresses doubt that the group of beings that have a point of view coincides with the group of beings that possess sentience, though he does not offer any argument for his doubt.[871] He also believes that if we use the having of a point of view as criteria for moral standing, many humans including "the profoundly senile, the very severely retarded, and newborn infants" would be excluded since they according to him, "obviously lack a point of view".[872]

It seems to me that Nelson is putting too much and too little into the term. Exactly how he defines 'point of view' is not clear but it does not seem to have much in common with the way we have talked about it above.

I believe the sense of the term according to which it includes all and only sentient beings, and at the same time answers the question why it is necessary in order to have interests can be best understood trough an analogy:

If someone breaks my computer we would say that the computer has been severely damaged. Maybe we would even say that it has been harmed (though this is much less obvious). We would probably also say that harm has been inflicted on me, since it affects me negatively if my computer is destroyed.

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[867] Levine 1997 p.379
[868] Jamieson 1998 p.47. See also p.48. Jamieson uses the term 'primary value' as a synonym for moral standing.
[869] Thompson 1990 p.159
[870] Nelson 1993 p.253
[871] Nelson 1993 p.249 note 10
[872] Nelson 1993 p.252

There seems to be a relevant difference between my computer and me, however. That the computer is damaged or harmed is a judgement made by someone *outside* the computer. It is judged as a damage or a harm by me and maybe also by other human observers. It is, however, not judged *by the computer* to be a harm of the computer. The computer might have a program that checks it for malfunctions and if it is not totally dead, that program might still work. In that case, we might say that the computer notices the harm at least in some sense of 'notice'. Maybe a sign turns up on the screen saying that something is wrong.

Even so, it is not the computer that *judges* the change that has happened to it as a harm or even as a malfunction. It "notices" a change and finds that the change fits with the criteria of harm that have been set by the human(s) who programmed the computer and therefore the program labels the changes as harms.

The effect on me that results from the damage of my computer might also be observed by other human beings. Different humans may have different opinions about whether what has happened to me (the loss of my computer) should be classified as a harm. Contrary to the computer, however I *myself* can also judge what has happened to me as a harm. The standard explanation for this difference between my computer and me is that I am a sentient being while the computer is not. This means that even if both my computer and I are harmed from an *exterior* perspective, only I am harmed from an *interior* perspective. The computer might break, it might stop working, or it might just change the way it works in a way that is judged by me as an impairment. It does not itself experience this as an impairment, however. It does not feel pain, agony or anger when it happens. It did not wish for it not to happen, and it was not afraid that it would happen – or to put it bluntly: It just does not care. It does not have any subjective feelings about it.

One might say that the computer is not a subjective I, or that it does not have its own perspective or point of view from which things can be felt as good or bad. A sentient being has a subjective viewpoint that the computer lacks and from which things are judged as good or bad. That is why I care about what happens to me – and to my computer – in a way that the computer does not.

Even if we were to assume that there is an objective way in which the computer is harmed, it does not help the case in question. As long as it is not *subjectively harmed from the point of view of the computer*, we do not seem to be able to talk about what has happened as something that frustrates *an interest of the computer*. As a result, any moral duties we might have concerning the computer cannot be duties to the computer, or more precisely to consider any interests of the computer. My subjective point of view thus seems to me to be the morally relevant difference between the computer and me.

Three phenomena that are used to be seen as closely connected with both sentience and interests are pain, experiences and preferences. These phenomena are generally assumed to presume sentience, and they all seem to be subjective phenomena. The abilities to feel pain or to have experiences or preferences are also often mentioned individually or together as being necessary for the

possession of interests.[873] The ecocentrists – especially Johnson – have also spent quite a lot of effort trying to refute this belief. I will therefore use the three following sub-sections for a closer look at this particular debate.

6.2.2. Pain

In the previous sub-section we found several strong reasons to assume that sentience really is a necessary prerequisite to have interests. The most important was that the most compelling analysis of what it means to say that someone has an interest is that something is good or bad from the subjective perspective of the entity that has the interest. To have a subjective perspective – or a point of view – clearly demands sentience.

One phenomenon that fits very well with this analysis is pain. Avoiding pain is often used as a paradigm example of a thing that is in the interest of moral objects. It is also generally agreed that the ability to feel pain is something that requires sentience, and it is often used as a criteria for moral standing. Because the ability to feel pain is so widely held as requiring sentience and as being a paradigm example of interests, ecocentrists have been very eager to downplay the direct moral relevance of pain. They argue that pain is not even bad in itself. It is not the subjective experience as such that is bad, but the underlying threat to our biological functions that the pain indicates. Pain, it is claimed, is just information. It is a useful ability in sentient beings since it keeps us informed about things that threaten us, but it does not mean that things that cannot experience pain cannot be threatened in the same way – and therefore has the same interest in avoiding these threats. They just lack our particular means of being informed about the threat.[874]

According to Callicott:

> Pain and pleasure seem to have nothing at all to do with good and evil if our appraisal is taken from the vantage point of ecological biology. Pain in particular is primarily information. In animals, it informs the central nervous system of stress, irritation, or trauma in outlying regions of the organism.[875]

[873] See e.g. Anderberg 1994 pp.93f, Egonsson 1990 p.79, Warren 1996 p.14. Sober points out that it is difficult to imagine what it would mean to have an interest for someone or something that does not have a mind (Sober 1986 p.184). It seems that a 'mind', the way Sober uses it, is the same as a subjective consciousness.
[874] Callicott 1980 p.332, Johnson 1991 pp.105f, 147, Morito 1993 p.61, Rolston 1988 p.60
[875] Callicott 1980 p.332

He even calls the idea that pain is intrinsically bad "life-loathing" and "biologically preposterous",[876] and he compares it with the lacking logic of a tyrant who decapitates the messenger because he brings bad news.[877]

The claim that pain is nothing but information is clearly wrong. It is in fact just as much motivation as information.[878] Pain is not just calmly informing the organism that this or that has happened. It immediately motivates the organism in pain to do something about it – to withdraw the hand from the hot stove or to move the bodyweight from the wounded foot for example. This is important because this role can only be fulfilled if pain is experienced as intrinsically bad by the individual in pain.

One argument against the claim that pain is intrinsically bad is, as Callicott points out, that pain sometimes is experienced as good rather than bad.[879] A possible explanation to why that is the case is proposed by Helm who claims that pain in these instances are associated with something good and therefore experienced as good.[880] Given what we know about conditioning, this seems like a plausible explanation. We also have to remember that even in the cases where pain is experienced as good, it is still motivational – though in the opposite direction. Pointing out that pain sometimes is experienced as good therefore does not give the ecocentrists the argument they need.

It has been argued that even when pain is experienced as bad it is still a good thing that we have the pain because it helps us avoid certain greater evils,[881] and it would be disastrous to just concentrate on relieving the pain and not do anything about the cause of the pain.[882] This in turn can be seen as supporting the claim that alleviating the threat to the biological wellbeing is the real interest of the organism.

This argument can be answered by pointing out that the destruction of biological functions in turn causes more pain and other types of bad experiences, or goes against other sentient interests of the organism. What sentientistic ethicists claim is not that avoiding pain is the only interest but that it is the most basic type of interest and even that demands sentience. We also have other types of sentient interest,[883] and a well functioning body is in general instrumentally important for these interests to be satisfied. If we turn the situation around and change the functions of the organism in such a way that it does not in any way affect any sentient interest, have we then done anything wrong?

It is also important to distinguish between pain and the ability to feel pain. The ability to feel pain is instrumentally very valuable for sentient organisms because it helps us (through both information and motivation) to keep away from things that might injure our instrumentally important body functions. The

[876] Callicott 1980 p.333
[877] Callicott 1980 p.332
[878] Broom 1998 pp.377ff, Helm 2002 pp.13, 27
[879] Callicott 1980 p.332.
[880] Helm 2002 p.26
[881] Biswas-Diener et al 2004 p.24
[882] Broom 1998 p.380
[883] More about that in the next two sub-sections.

explanation why this works so well is that pain typically is experienced as intrinsically bad.

An important problem with the ecocentric claim that pain is just an indicator of the real threat is that it just assumes that the biological role of pain totally decides its ethical relevance. It is perfectly correct that the ability to feel pain is an effective way of making organisms avoid things that tend to make the organism less fit in an evolutionary sense, and that this undoubtedly is the explanation why pain has evolved. This fact does not show, however, that it is the biological malfunctions that are the real interests. That A is the evolutionary cause of B does not tell us anything of whether A or B qualifies as an interest.

To sum up: The ecocentric argument was that pain is not in itself intrinsically bad but only an indication that a biological malfunction is threatening the organism – and that this shows that the real interest at stake is not in the form of the subjective experience (the feeling of pain) but in the form of an objective biological fact. As far as I can see, however, this is not what the argument shows. That pain has an instrumental biological function does not show that the subjective experience is not a real interest.

6.2.3. Experiences

The avoidance of pain is only one of the things that are in the interest of moral objects. There is still a possibility that some of the other interests are not in the form of subjective experiences. This is precisely what the advocates of ecocentrism try to show. They do not argue that interests are never in the form of subjective experiences, only that some interests are not. By showing that interests do not *have to* be tied to experiences, they hope to be able to establish that interests do not have to be in the form of mental states, and therefore that sentience is not necessary to have interests.[884]

Probably, the most famous argument against the mental states theory of interests was first formulated by Robert Nozick. It takes the form of an experience machine that is a fictive device that can give you different kinds of experiences by stimulating your brain directly. When you are hooked up to the machine, you believe that the things you experience are actually happening. That way you can have a perfect life in terms of experiences even though none of the things you experience are really happening.[885]

If subjective experiences were all that are relevant, then it would be irrational not to agree to be hooked up to the machine all the time and live our lives through it. Nozick thinks, however, that most people would not want to be

[884] Johnson 1991 pp.98, 100
[885] Nozick 1974 pp.42f

confined to this kind of life, and the explanation that Nozick gives is that experiences or mental states are not the only things that matter to us.[886]

Johnson agrees with Nozick both that people would not want to hook up to the machine, and that this example shows that experiences are not the only things that are relevant.[887] Johnson goes a step further, however, by arguing that if we acknowledge this, "the way starts to open up for even non-conscious beings to have morally significant interests."[888]

Nozick's experience machine has been the subject of many discussions,[889] but I will not deviate too much from our main subject by a detailed description of this discussion. I think that the thought experiment is convincing enough to be taken seriously, and instead of dwelling on the experiment or on Nozick's conclusion, I will simply take them for granted, and concentrate on Johnson's conclusion that this opens up the possibility that non-conscious beings have interests.

One way of objecting to this conclusion is to argue that the reason why we are not satisfied with the experience machine is that we want the things we experience to really happen, but that the experience is still necessary. Experiences are not always sufficient, but they are always necessary. This would explain why people are not satisfied with being connected to the machine.

Johnson has an answer to this objection in the form of another thought experiment. In this experiment, an athlete collapses over the finish line. She is taken to the hospital where she briefly recovers consciousness, and then dies before anyone manages to tell her the result. According to Johnson, victory is in her interest even though she will never experience the victory.[890]

This conclusion is controversial but not totally unreasonable. Other philosophers have also argued that one can have interests regarding things that will happen after one's death.[891] It does not seem unreasonable, for example, to claim that it is in someone's interest that his grandchildren have good lives when he is dead. In that case he cannot experience the satisfaction of seeing his grandchildren prosper, which means that it would be an example of an interest that cannot be explained by saying that subjective experiences are necessary but not sufficient. In this case, it looks like no subjective experience is necessary.

We do not have to accept that things that happen after our death can be in our interests in order for Johnson's answer to be valid, however. Johnson points out that many sincere and thoughtful people have held many other things than pleasure and pain to be intrinsically important in their lives.[892] I think this can be

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[886] Nozick 1974 p.43
[887] Johnson 1991 p.99f
[888] Johnson 1991 p.101
[889] See e.g. Darwall 1997 pp.162, 178, Finnis 1980 p.33, Finnis 1983 pp.37-42, Kawall 1999 pp.383ff, Lemos 2002 passim, Lemos 2004 pp.518ff, Riviera-López 2007 passim, Silverstein 2000 passim, Thomson 1987 p.41
[890] Johnson 1991 p.101
[891] See e.g. Egonsson 1990 p.43
[892] Johnson 1991 p.98

generalized to say that many sincere and thoughtful people have held other things than their own experiences to be intrinsically important.

Jason Kawall points out that it is almost universally held that we can value other things than our wellbeing. We can even value things higher than our own wellbeing. A scientist may be so devoted to searching for the truth that she is prepared to sacrifice her own wellbeing. Parents are often more devoted to the wellbeing of their children than to their own wellbeing.[893]

Other authors have reasoned in the same way. It has, for example, been pointed out that it is possible to live a valuable life even if one is unhappy,[894] and that people often are prepared to sacrifice short-term happiness for other goals.[895]

I agree with these points. Not just scientists are prepared to have fewer positive experiences in their lives in order to accomplish other things. The same seems to be the case with, for example, athletes, artists and activists of different kinds. I also believe that few of us can sincerely say that we do not care about anything other than our own experiences. Few of us would probably seriously maintain that *what you don't know can't harm you*.[896] The only way of avoiding that conclusion must be to hold that experiences are not necessary to have interests.[897]

The general conclusion must be that an interest in something does not have to imply an interest in experiencing it, and that an interest for something not to be the case does not have to consist solely of an interest not to experience it.

Sometimes it is said that things we do not experience ourselves cannot make our lives fare better or worse, and that this is the really relevant criterion that something is in our interest.[898] It is true that if we do not experience something, or in any way get to know about it, the thing or event cannot make our lives better or worse. I do not think this *the* criteria of what is in our interests, however. We found in the beginning of this section that the question about what is in our interest must be a matter of what is good or bad from our subjective point of view. If we want something to happen in another part of the world, the issue is not whether that makes our life better (from one perspective or other) but whether that thing is better from our perspective. If something happens to us that make our lives better seen from someone else's perspective but not from our own, we can say that what happened was in their interest – not that it was in our interest.

The next question will be whether the conclusion that experiences do not have to be in the form of experiences also grants that – as Johnson puts it – "the

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[893] Kawall 1999 p.385. The term "Wellbeing" is used in different ways by different authors. For Kawall our wellbeing is about our mental states, which means that what he acknowledges above is that we can value other things higher than mental states.

[894] Riviera-López 2007 p.75

[895] Biswas-Diener et al 2004 p.24. It is interesting that they talk about short-term happiness and not just happiness. Apparently they do not exclude the possibility that the other goals can be in terms of long-term happiness. I do not believe that this is what they actually intend however.

[896] What you do not know can clearly still harm you instrumentally. What I refer to here are things that will never directly or indirectly have any effect on your mental state.

[897] Egonsson 1990 pp.33ff

[898] Riviera-López 2007 p.78

way starts to open up for even non-conscious beings to have morally significant interests."[899]

According to Johnson:

> The most plausible reason why sentience should be necessary in order for interests to be morally significant is that it should make a felt difference to the interest haver whether its interests are satisfied.[900]

It is not the only reason, however, and I do not agree that it is the most plausible reason. It does not follow from the conclusion above that something that never has any experiences at all can have any interests. It is still possible to claim that even though we can have interests in things without having an interest in experiencing them, we cannot have an interest in anything if we have never had any experiences at all. It is at least not obvious that preceding experiences are irrelevant to the question. It is quite possible that you need to have had some kind of experience that has been good or bad from your subjective perspective in order to be able to hold that it would be a good or a bad thing that something happens – whether you experience that particular event or not. I do not think, for instance, that Johnson's story about the athlete who collapses on the finish line would have been very convincing if it were a race between objects – robots for example – that have never experienced anything at all, neither before, nor after the race (independently of whether the winning robot crashes so it can never be repaired). The athlete in Johnson's example never got to experience the victory, but she certainly had experiences before the victory that among other things, might have given her a preference to win the race.

Even if it is not the case that we need to have had positive and negative experiences in order to be able to value things as good or bad (whether experienced or not), it can hardly be denied that we need to be sentient in order for things to be good or bad from your perspective. We saw above that the most plausible explanation of what it means to have an interest in something is that the something is subjectively evaluated as good or bad from someone's point of view. This does not exclude that other things than subjective experiences have subjective value and therefore is in someone's interest, but it does exclude that things that have no subjective value from someone's perspective can be in that someone's interest.

The most common alternative to interests in the form of experiences is not, in fact, interests that do not presuppose sentience, but interests in the form of preferences or desires. To have a preference for something is a way of subjectively valuating something as good or bad (whether one will experience it or not). In the next sub-section we will therefore take a closer look at preferences as interests – and the ecocentric arguments that preferences are not necessary to have interests.

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[899] Johnson 1991 p.101
[900] Johnson 1991 p.160

6.2.4. Preferences

The next alternative answer to the question of what constitutes an interest are our preferences. In order to have preferences it is necessary to have a subjective point of view and therefore to be sentient. It might be that preferences can account for the cases where we have interests in things without having an interest in experiencing them.

This is not something that the ecocentrists believe, however. On the contrary: In order to maintain that it is not necessary to be a sentient individual to have morally relevant interests, the ecocentrists have to deny that the ability of having either experiences or preferences is a necessary prerequisite for someone to have interests.[901]

Johnson's main argument for why our interests can be constituted by something else other than preferences is the intuition that people sometimes have preferences for things that are not good for them.[902] This sounds like a plausible intuition, and it is also pointed out by not only ecocentrists.[903] We sometimes do feel that fulfilling certain preferences is not good for the individual who has the preference. The question is: How should we interpret that intuition?

We could say that the intuition is just wrong, that what we prefer is *necessarily* what is in our interest, and that when it seems that what we prefer is not good for us, then we have confused the question of what is in our interests with some other sense of 'good for us' (perhaps a medical or evolutionary sense). This answer will however just reduce the question to an intuitive level and it will not convince those who do not already share this intuition.

Another possibility is that those who claim that satisfying someone's preference is not good for her, just projects their own preferences or the preferences that are standard in the society on those who have other preferences. They therefore conclude that there must be something wrong with the person who has the deviating preference, and that she has not understood what is really in her interest.

I believe that this is a correct explanation in some cases, but not always. There are still cases where it is probably correct to say that satisfying a certain preference is not in the interest of the individual whose preference it is. I will try to find an explanation for this that is compatible with the assumption that only preferences can constitute interests.

One might be tempted to explain the occurrences of preferences that it would not be good for us to satisfy, by pointing out that in some cases we have preferences for things that will decrease the number of positive experiences. As we saw above, however, it is not obviously true that experiences must be more important than other interests. We saw, for example, that it is quite common that people are prepared to sacrifice good experiences in order to promote other interests, and we did not find that unreasonable.

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[901] Johnson 1991 pp.102ff
[902] Johnson 1991 p.102. See also Samuelsson 2008 p.88
[903] See e.g. Egonsson 1990 p.91 and Regan, Tom 1983 pp.104, 106

One possible explanation to why it sometimes is bad for us to have a particular preference satisfied is that we have conflicting preferences. Considering how many preferences most of us carry around, it would not be surprising if some of them where in conflict. Neither should this suggestion be particularly surprising for most of us. I guess that every human by introspection can conclude that he or she sometimes has conflicting preferences.

This in turn means that we have a good chance of being able to explain cases where the satisfaction of a preference would not be good for us, by referring to other preferences. The phrase 'the satisfaction of this preference would not be good for him' might well mean that the satisfaction of this preference would go against some other preference of his.

An apparent problem with this suggestion is that it does not tell us how to decide in cases like this. It looks like we would have to say that 'satisfying the preference would not be good for him (since it frustrates another preference) but the same is true for not satisfying the preference (since that would of course frustrate this preference)'. This would be a rather simplified way of looking at things however. There are several ways of prioritizing between preferences. One simple way is to prioritize based on a majority rule. The pursuit and eventual satisfaction of a certain preference tends to have effects on more than one other preference. If satisfying a certain preference has the effect that the total sum of satisfied preferences for the person in question will be lower than it would if we do not satisfy that particular preference, then we might have a good reason for saying that satisfying that preference would be bad for the preference holder.[904]

This would in practice mean that we apply some kind of "intra-personal utilitarianism". But as we know, utilitarianism has its own problems. One such problem is pointed out by Derek Parfit: Imagine a drug that will make you addicted to the drug if you have it once. The addiction works like this: Every morning you will feel a desire to have an injection of the drug. As long as you get the drug within an hour, nothing will happen other than that you get the desire fulfilled. It will not give you any pleasure or any pain. If you do not get the drug within an hour you will experience great pain. You will get ample supplies of the drug so the attaining of the drug will not give you any problems and there will not be any other side effects.[905]

In this example we have chemically created a desire in you that you will have every morning – and that will be fulfilled every time you have it. If we base our concept of interests on preferences and also accept a summative method for prioritizing between preferences, it will be a good thing to take this drug in the first place since it will increase the number of fulfilled preferences in your life. According to Parfit, it would however be very improbable that it would be better for you to have and fulfil this desire.[906] This conclusion looks plausible. The question is how it should be interpreted. It might be seen as an argument against preferentialism, but it might also be interpreted, as just an argument against the

[904] Egonsson 1990 p.91
[905] Parfit 1984 p.497
[906] Parfit 1984 p.497

idea that the only thing that is relevant is *the sum* of satisfied interests. It seems to me that it is the summative approach rather than preferentialism as such that makes Parfit's example counterintuitive, and that is also in accordance with how Parfit uses the example – i.e. as an argument against "summative theories", and not against preferentialism.[907]

Parfit also dismisses an attempt to save the summative theory by suggesting that the preference in the example should not count because it is a preference that we would prefer not to have. He points out, however, that if you are sick and in great pain you probably have a preference not to be in that state. This also implies however that you have a preference not to have the preference not to be in that state. Should that preference therefore not count?[908]

An alternative way of approaching the problem is to deny that it is as counterintuitive as it first looks. Maybe it just looks counterintuitive because the preference is chemically triggered. We are as Egonsson points out, used to drugs having negative effects. We may therefore have difficulties ignoring that when we consider Parfit's example.[909] In this example the only effect of the drug was that it creates easily satisfied preferences, which means that we might not be able to trust our initial reactions in this case.

It might also be that we have troubles connecting this preference to my interest since it is artificially induced from the outside. It is not obvious, however, that preferences that are artificially induced from the outside of the preference holders cannot be interests of that individual. Dogs are in general bred by human beings with the aim of promoting certain properties. That is also the case with preferences. Dogs are picked out for breeding not just because they are good at tracking, retrieving, guarding, herding, pulling, etc., but also, because they like to do these things. In the future we will probably be able to influence the preferences of individual animals by genetic engineering. Putting the question of whether we should do that aside: If we assume that we are dealing with an animal that is genetically engineered to have a strong preference for a certain activity, is the fact that the preference is artificially induced from the outside a valid argument for disregarding the preference or deciding that it is not a real interest?

It is, in fact, quite difficult to maintain that evolving a wider range of satisfiable interests is not a good thing independently of how it is triggered. So maybe our initial reaction is just a result of an unwarranted prejudice against chemically induced preferences.

Another alternative explanation of the counter-intuitiveness of Parfit's problem is that when we judge the example, we do it based on our present preferences. From this position, taking the drug seems meaningless since we do not now have a preference for taking the drug, and we probably do not have a preference for satisfied preferences as such. It is not until we have taken the drug

[907] Parfit 1984 pp.496ff
[908] Parfit 1984 pp.497f
[909] Egonsson 1990 p.60

once that we will have a preference for taking the drug every morning. We therefore need to take this into account when we set our priorities.

There are also other problems than the one pointed out by Parfit in connection with summative theories. Johnson points out one such problem when he notes that for some people like infants and mentally handicapped people, the majority of their preferences are about things that are bad for them.[910]

One way of dealing with this problem is to say that the cause of the problem is that the persons in question lack rationality and that only informed (or rational or prudent – different terms are used by different authors) preferences constitute morally relevant interests.[911] If we accept this solution, we must ask what kind of information can do the job of weeding out all unacceptable preferences and leave all acceptable ones. An answer that seems close at hand and that would fit well into Johnson's reasoning is that it would be information of what is *really* in our interest. Preferences would then just serve as more or less accurate indicators of interests, and it would after all be possible to have interests without preferences. Johnson says that:

> What makes an object of actual or would-be desire good for us, when it is good for us, is that what is or would be desired contributes to our wellbeing. At best, reference to prudent desires can serve only as a criterion of an individual's good, not as its definition.[912]

That preferences are just more or less accurate indications of our *real* interests is not the only, or the most plausible answer to why some people have a majority of preferences that are not good for them, however. An important aspect of preferences is that we have both final and instrumental preferences. By final preferences I mean preferences for things because they have final value (or end value) from our subjective perspective. By instrumental preferences I mean preferences we have for things because we believe that they are useful means to things that have end value from our subjective perspective. When we talk about instrumental preferences it seems quite natural to see them as more or less rational since they are a result of how informed we are in a certain matter.[913]

This distinction is probably important when it comes to explaining why some people have a majority of preferences that are bad for them. Considering that there can be long threads of instrumental preferences before we reach a final preference, and considering that there is often more than one way of accomplishing a final preference, it seems reasonable to assume that the majority of our preferences are instrumental preferences. This, in combination with the

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[910] Johnson 1991 p.102

[911] Egonsson 1990 p.91, Johnson 1991 pp.102f

[912] Johnson 1991 p.103. Johnson defines wellbeing in biological, not experiential terms.

[913] Egonsson argues that basically only instrumental preferences can be rational or irrational (Egonsson 1990 pp.94f, 104ff,). I believe he is correct in that. He acknowledges that preferences can be seen as rational or irrational in relation to other interests based e.g. on their strengths (Egonsson 1990 p.114). I would instead like to suggest that we in this case instead call the *decision* rational or irrational depending on how well it prioritizes between preferences of different strengths.

nature of instrumental preferences, makes the distinction between final and instrumental preferences a good candidate for explaining how it can be that for some people the majority of their preferences are bad for them. The majority of their instrumental preferences are simply bad ways of attaining their final preferences, which are really what are in their interests since they are the result of their subjective perspectives.

There is also another aspect of the relations between preferences and rationality that might play a part in the explanation. Sometimes we have a preference for something because we falsely believe it has properties that from our perspective give it end value. We may, in other words, be mistaken regarding the nature of the things we have preferences for. Strictly speaking one should say that in this case we really do not have a preference for that thing but for something else with the right properties. So, we are not really mistaken here about our preferences (we *do* prefer things with these properties),[914] but about some factual assumption of the world (we believe that a certain entity has these properties). It might not always be easy to distinguish between these things in practice, which means that we may sometimes erroneously claim that it is not really in our interest to get a preference satisfied when we should say that achieving that particular thing will not really satisfy our preference since it does not really have the properties we think it has, and things that have these properties are really what we prefer.

Egonsson points out another strictly preferential answer to why it is sometimes not in our interest to have certain preferences satisfied, viz. that we have both long-term and short-term preferences.[915] To that we should add that there are preferences of different strength.[916] Both these facts are probably very important parts of the explanation since it is quite clear that it would be preferentially bad for the individual to satisfy a weak or short-term preference if it frustrates other, stronger or more long-term preferences.

It seems, thus, that it contrary to Johnson's assumption is possible to explain why it is sometimes bad for someone to have certain preferences satisfied, without having to accept Johnson's answer that preferences cannot be our real – or at least not our only real – interests.

Johnson has one more argument however. He tells us that it is

> absurdly superficial to say that we have an interest in nutrition because we have an interest in, or preference for, avoiding the pangs of hunger. Rather, we are organized in such a way as to feel the pangs of hunger because we have an interest in nutrition …[917]

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[914] This is not the same thing as saying that we have a preference for the properties rather than the object. That we prefer Chinese food over French food does not mean that we prefer everything Chinese over everything that is French and that we would rather listen to Chinese music than eat French food, etc.

[915] Egonsson 1990 p.91. Egonsson uses the term 'interest' where I use the term 'preference'.

[916] To distinguish between different "qualities" of preferences seems like a less fruitful approach, however, since it would just move the problem one step instead of solving it; i.e. we would then have to ask what constitutes higher or lower quality of preferences.

[917] Johnson 1991 p.141

He also claims that it would be

> an utter absurdity, totally back to front, to think that the role of the rest of our being was to make pleasure and pain possible …[918]

Finally, he claims that it would be

> nearly as absurd to think that the role of our being was to make our preferences and their satisfaction possible.[919]

Apparently, according to Johnson, preferentialism is slightly better than the mental state theory of interests that we discussed in the previous sub-section. It does not seem much better though, and it seems that the preferentialist too has got it all backwards.

Bruce Morito presents essentially the same argument slightly differently. He too argues that we have got it all backwards. According to him, our identity, and therefore our interests, are the result of our environment, including the evolutionary process. This in turn means that the value of nature is prior to our interests. Therefore, the value of nature cannot in turn depend on our preferences. Instead, we have to conclude that our preferences are there because they are instrumental to something else that really has value, like the survival of the organism.[920]

Rolston continues along the same track. He argues that our valuing system has evolved to make us better adapted to our niche. If it were not like that, it would be difficult to explain how we can have a valuing system. Because of this, Rolston concludes that our valuing reflects value that is actually there.[921] He also points out that:

> Science has been steadily showing how the consequents (life, mind) are built on their precedents (energy, matter), however much they overleap them.[922]

This shows, according to Rolston that value exists in all of nature, not just where there are humans and higher animals present.[923]

This argument is puzzling in all its formulations. It seems that the ecocentrists assume that we and our different capacities have been assigned certain roles, and they seem to assume that the real question is to determine what the different roles are. This way of arguing has no persuasive power for anyone who does not have a teleological view of the world or of ourselves.

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[918] Johnson 1991 p.147
[919] Johnson 1991 p.147
[920] Morito 1993 pp.57f, passim
[921] Rolston 1988 p.210
[922] Rolston 1988 p.216
[923] Rolston 1988 p.216

The ecocentrists argue from the fact that our preferences depend on and have evolved from more basic phenomena, to the conclusion that these phenomena therefore must be more important interests than the preferences. This does not follow, however. The question of which of two things that are more important cannot be decided by which of these things that is the cause of the other.

The factual statement is probably correct but it does not grant the conclusion. It would be very difficult to explain how our valuing system could spread in nature the way it has if it did not make us more adapted to our environment and if it did not increase our evolutionary fitness. Does this mean that the things behind this adaptation are what are really in our interest, while our preferences are just more or less fallible indications of these things? Let us make an analogy. Let us say that we were created by a self-centred god who gave us the capacity for making value judgement because he wanted us to value him. Let us then assume that as time went by we found other things that fitted better with the template he had blessed us with, and that we came to value them higher than our creator. Would it be reasonable to say that we are just wrong and that no matter how much we value these things it is really the god that has value because we got our valuing capacity in order to value the god? This conclusion does not seem plausible. Let us look at another, more down to earth, analogy. Let us say that a couple decide that they want a daughter who will one day grow up to be the leader of a certain political party. As it turns out, however, the daughter becomes a sympathiser of a different party or does not care about politics at all. Would we then say that it is still in her interest to become the leader of the party her parents wanted her to lead? This conclusion seems equally counterintuitive.

Rolston presents another argument for why we have both 'psychological' and 'biological' interests, as he puts it. The argument is that following one's psychological interests might be detrimental to one's biological interests.[924]

It seems quite clear, however, that Rolston is actually begging the question. Johnson argued above that some or most of our preferences might go against our interests and that a possible explanation for that was that our biological wellbeing is what is really in our interest. At a distance, Rolston's argument might look similar, but it is not. Rolston does not base his argument on a reasonable intuition that needs to be explained, and he does not use biological interests as a possible solution. Instead he starts by assuming that there is such a thing as biological interests that are different from, and sometimes collide with, our preferences. At the same time, this is what Rolston wants to conclude and therefore not something he can use as an argument for that same conclusion. That the satisfaction of some preferences can have certain effects on some biological functions seems quite clear. Are these cases contrary to any biological *interests*? That of course depends on whether we have any biological interests (and not just biological states whose functionality is judged relative to our preferences) – and that is what Rolston still needs an argument for.

[924] Rolston 1988 p.108. He adds within parenthesis that this in turn results in psychological suffering but that does not stop him from focusing on the biological interests.

To sum this up, it looks like the standard examples of sentient interests still hold up. Not all interests must be in the form of experiences, but we have not found any credible example of an interest that cannot be accounted for by referring to preferences, and we have not found any viable argument for accepting that the real interests are to be found beyond our sentient preferences.

6.2.5. Biological wellbeing

Preferences, as we have seen, seems to be a good candidate for constituting interests. Since the ecocentrists acknowledge that only sentient beings can have preferences they cannot accept preferences as the only type of interest, however. If they did, non-sentient beings as well as species and ecosystems would have to be left out. Finding something else than preferences that can constitute interests is therefore of utmost importance for the ecocentrists.

The most popular alternative answer among the ecocentrists to what constitutes an interest is what I will call 'biological wellbeing' for short.[925] The basis of this idea seems to be that it is in our interest that our body works in a certain way, and it is in our interest that it does whether we have preferences about it or not. The same is supposed to be the same for species and ecosystems. Aldo Leopold defines the health of the land as its capacity for self-renewal.[926]

According to Johnson, health (in a broad sense), "is a matter of our effective overall integrated functioning".[927] This means that what is in our interest, "are those things that contribute to the overall effective functioning of our life process as a whole."[928]

Effective functioning thus seems to be some sort of key. What then is "effective functioning", and how can we define it without referring to preferences?

Johnson admits that he cannot present any fully developed definitions of 'effectively' or of 'functioning', but he does not think that it is necessary to have such definitions. He believes that it is enough to point out that there must be such a thing as physical and mental good health in terms of effective integrated functioning even though we cannot yet say what it amounts to.[929] He also claims that he is not presupposing, and does not have to presuppose, a particular concept of the good.[930]

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[925] Johnson uses the even shorter term 'wellbeing'. Rolston in turn uses the term biological interests.
[926] Leopold 1970 p.258
[927] Johnson 1991 pp.143f
[928] Johnson 1991 p.133. See also pp.141f, 145
[929] Johnson 1991 p.144
[930] Johnson 1991 p.145

I am not convinced by Johnson's guarantees that it is not necessary to present any fully developed definitions of 'effective' or of 'functioning'. He might not need any exact definitions, but he needs to tell us how to recognise effective functioning, and he needs to convince us that it is possible to define effective functioning in a way that is independent of any perspective of sentient beings. Both terms 'effective' and 'functioning' seem to be of an instrumental nature. To say that something is functioning better or worse normally assumes that it is functioning better or worse in relation to some goal. The same seems to be the case with 'effective'. If we say that something is effective, we usually assume some kind of goal that it is effective as a means to. I therefore believe that if someone (like Johnson) sees effective functioning as an interest in its own right, we are entitled to some explanation of what that means.

Johnson's main argument for seeing biological wellbeing as an interest is negative. In the previous two sub-sections we have seen that he dismisses both experiences and preferences as the sole types of interest. When we discussed experiences above, we concluded that he is probably right that not all interests can be reduced to experiences. The main argument for that was in the form of Nozick's experience machine. On the other hand, it is only fair to ask whether Johnson's alternative answer in the form of biological wellbeing would fare any better in that respect. Samuelsson does not think so. He points out that we could modify the experience machine so that it also takes care of our bodily needs. One machine can provide our bodies with nourishment and exercise, etc. while another machine stimulates our brains with experiences.[931] This shows that not all interests can be reduced to biological wellbeing of experiences. Johnson does not claim that all interests can be reduced in this way. He acknowledges that organisms with preferences also have preferential preferences, but he does maintain that in a case of conflict, biological wellbeing overrules desires. [932] This seems to imply that if we follow Johnson and if Samuelsson's improvement of the experience machine is so good that our bodily functions would be better taken care of by the machine than by us (which does not seem too far-fetched), it would actually be irrational not to be hooked up to the machine.

Johnson's main argument for concluding that not all interests can be in the form of preferences was that it is sometimes bad for people to have a certain preference or set of preferences satisfied. He therefore concludes that there must be some other type of interest that is even more basic than experiences and preferences. He claims that while the interests of sentient beings in some instances are in the form of sentient desires or preferences, or at least are influenced by our sentient choices, some preferences are just indicators of something else that is *really* in our interest – indicators that sometimes are accurate but sometimes are deeply mistaken. Other interests in turn have no relation at all to our sentience.[933] The only thing that, according to Johnson, can constitute these non-preferential, non-experiential interests is our biological

[931] Samuelsson 2008 pp.132f
[932] Johnson 1991 pp.108ff
[933] Johnson 1991 pp.6, 106f, 109, 113, 116f

wellbeing,[934] or as he also describes it: What is good for us – whether we desire it or not.[935]

As we saw in the previous sub-section, however, Johnson's conclusion regarding preferences was premature. We found several alternative explanations why it is sometimes bad for us to have a preference or set of preferences satisfied – explanations that themselves were based on preferences. We therefore concluded that even though it is sometimes bad for us to have certain preferences satisfied, it is bad because of other preferences. Preferentialism, therefore, does not leave the void that Johnson relies on. In order to establish that there are other types of interest that do not presuppose sentience, the ecocentrists therefore need other independent arguments.

That there must be something else behind our preferences and that this something makes up the real interests is a track that also Bruce Morito has explored. He argues that the fact that our food preferences are directed at the things our bodies need shows that our interests are decided by our biological needs. Horses, for instance, are not attracted to meat and we are not attracted to hay.[936] He also points out that pain teaches us about how to comply with our basic needs – so obviously it is the basic needs and not the pain that are important.[937]

This is not enough to prove that our real interests are to be found in our biological functions, however. It only informs us about the evolutionary background of our interests. It does not tell us that our biological functions *are* interests in themselves whether we care about them or not, or whether they have any instrumental import to our preferences or not. Neither does it tell us that biological functions in beings that do not have any preferences can be interests.

Using the word 'needs', as Morito does, is very suggestive. It seems intuitively obvious that if anything is in our interests, it is to satisfy our needs. 'Needs' is a very slippery term, however. I suspect that when we usually talk about our needs and the importance of having them satisfied we are talking about things that have a high degree of instrumental value for many or maybe all of our preferences. Food, as Morito mentions, is very instrumentally valuable, and I cannot imagine how food could have value that cannot be referred to a preferential value or to some function that is instrumentally important for one or more of our preferences. Neither has Morito presented any value of food that cannot in the end be referred to preference satisfaction – for humans or horses. The same goes for other basic bodily needs.

Let us imagine a change of a bodily function of a sentient being that the being does not care about, and that does not have any effect on anything that he or any other sentient being cares about. In what way is it then important? Is it even comprehensible to talk about it as important?

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[934] Johnson 1991 pp.109, 114. Johnson uses the term 'wellbeing' only in relation to our biological functioning.
[935] Johnson 1991 p.98
[936] Morito 1993 p.58
[937] Morito 1993 p.62

Just like Johnson, Val Plumwood also claims that health can and should be defined in purely biological non-preferential terms. She argues that it is impossible to define the health of inner organs without referring to the function of the organism. If our bodily functions were to change in such a way that our bodies would need a kidney that works in a totally different way from how kidneys we consider healthy work today, then our criteria for a healthy kidney would change accordingly.[938]

That is probably true, but the explanation for that in turn must reasonably be interpreted in terms of our preferences. It is necessary for most of our preferences that our bodies work in a certain way, which includes that our kidneys fulfil certain functions. On the other hand, if our bodily functions were to change in a way that does not in any way affect our preferences, would it then still be in our interest that the kidneys adapt to the new body functions?

Some environmental policy texts as well as some biological texts do talk about ecosystem health.[939] It is seldom made clear what that means, however. One article tells us that: "Ecosystem health is determined by biophysical criteria, including system structures and functions."[940] Nothing in this text indicates that this definition is independent of the perspective of sentient beings. On the contrary, it seems quite clear that the author is talking from the perspective of a biologist who likes to study nature. The same seems to be true of other such texts. In policy texts, it is equally clear (at least) that the health of the natural systems is defined from an anthropocentric instrumental perspective.

Another attempt to define wellbeing (or welfare) by the help of biological functioning is presented by Donald M. Broom. He defines the welfare of an individual as "its state as regards its attempts to cope with its environment".[941] Feelings are, according to him, important and have to be included in his definition of welfare, but that is not all.[942] He also wants to include "behaviour, physiology, brain functioning, immune system functioning, pathology, injury, and life expectancy".[943] Some measurements of welfare, like immune system function, may, according to Broom, not have anything at all to do with feelings.[944]

Broom is, in ethical terms, best described as an 'animal welfarist', but his definition seems to open the possibility that also other entities can have moral standing. Can it be of any help to the ecocentrists? A problem with his definition of welfare is that it, just like Johnson's is very obscure. What does it mean to cope with one's environment? Is it only about survival or does it mean something more? Another problem is that Broom has not explained why the kind of welfare he talks about is relevant. Considering, however, that Broom believes that it is

[938] Plumwood 1991 p.146
[939] Farber 2000 p.s492
[940] Farber 2000 p.s492
[941] Broom 1998 p.394
[942] Broom 1998 p.394
[943] Broom 1998 p.394
[944] Broom 1998 p.397

only meaningful to talk about the welfare of individual animals,[945] and that he is working with animal welfare from a veterinarian perspective, we can expect that in spite of the seemingly ecocentric approach, he implicitly assumes that the things he mentions are relevant because they are (instrumentally) important for satisfying the preferences of the animals in question. Interpreted in that way they make much more sense than as interests in their own right. Broom's aim is to identify the things we should consider in practical animal care. Animals are not as good as we are at expressing their preferences in words, and feelings are not easy to measure and interpret. This means that in practice we often have to rely on behavioural and physical indicators. However, it is still important to remember that we are talking about indicators, not about the interest in itself. I therefore suspect that 'welfare' as it is used by Broom should not be confused with the 'interests' we talk about here. The kind of welfare Broom talks about can be a reasonable aim for practical animal care because it is reasonably measurable and a reasonable indicator of real interests, but it cannot be used as a form of interests in itself. If we see coping with the environment as an independent form of interest, we cannot, in fact, even motivate why we should exclude mechanical constructions or other human constructs like nations.

Rolston provides his own version of the idea of interests as biological wellbeing. He distinguishes between psychological interests and biological interests, where the former are about experiences, while the latter are about what is needed to stay alive.[946]

This version has the advantage that it is simpler and clearer than Johnson's. It is not clear, however, why staying alive is relevant if it is not connected to any preference of the entity in question, or is at least an instrumental prerequisite for preferences to be fulfilled. We are still in need of an explanation how something can be in someone's interest without being subjectively good from the perspective of that someone. It is one thing that staying alive is, in general, instrumentally important for fulfilling real interests, but why is it an interest of its own?

Rolston refers to ground squirrels who take junk food from tourists as an example of how a psychological interest can be detrimental to ones biological interests.[947] This example cannot in itself be seen as an argument that biological wellbeing is an interest in itself, however. It might still be the case that satisfying the interest for junk food is bad for the squirrels because the resulting bad health will frustrate other interests that together are stronger than the preference for junk food. It is thus perfectly compatible with the purely preferential explanations presented in the previous sub-section for why it can be bad for someone to have certain preferences satisfied. We are still in need of an example of how biological health can be an interest even when it is not a prerequisite for the satisfaction of preferential interests.

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[945] Broom 1998 p.394
[946] Rolston 1988 p.52 He also talks about "genetically based preferences" (Rolston 1988 p.109).
[947] Rolston 1988 p.52

It is also unclear why staying alive in a biological meaning is relevantly different from other forms of continued existence. Why is not the maintenance and fuel needed for machines to continue working an interest of the machine? Elliott Sober has, for example, argued that if we, by a need, just mean something that is necessary for continued existence, then species have needs only in the same sense as things like cars and buildings have needs.[948]

This question is even more pressing since Rolston is talking about the continued existence of species, which is already a widening of what we normally mean by 'staying alive'.

Rolston's distinction between psychological and biological interests looks a lot like Tom Regan's distinction between *preference-interests* and *welfare-interests*. Regan does not want to include welfare-interests in the category of morally relevant interests, however. According to him, "we can make sense of saying that cars and flowers need water without implying that they desire it."[949] According to Regan, animals – including humans – have needs of the same type as cars and flowers, but contrary to cars and flowers, animals also have psychological and social needs.[950] What seems to be the key difference, however, is that animals have preferences:

> Like flowers, animals have a basic biological need for water and nourishment; but like us, and in this respect unlike flowers, they *prefer* to have these needs satisfied rather than unsatisfied.[951]

Singer makes a similar point. He argues that a tree has an interest in water only in the sense that it needs it in order to survive and grow. To see that as an interest in a moral sense would, according to him, be almost like saying that lubrication is in the interest of a car because it needs it to run.[952]

Ecocentrists deny that interests have to be in the form of preferences, but at the same time they do not want to grant moral standing to cars. They therefore owe us an explanation why things needed to uphold the functions of an entity or a system can constitute interests in some cases (living beings, species and ecosystems) and not in others (e.g. cars).

Mark Bernstein argues that if we say that something has wellbeing, it must be intelligible for us what it means. Otherwise it will just become an Alice-in-Wonderland-type word game.[953] He even goes (what I perceive as) one step further and argues that the harm or benefit must be "analogous or comparable to

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[948] Sober 1986 p.184
[949] Regan, Tom 1983 pp.88f
[950] Regan, Tom 1983 p.90. It is somehow difficult to imagine solitary animals having social needs, but on the other hand, even these animals have occasional interactions with other members of its species: They sometimes fight off competitors, males and females sometimes meet if only to propagate, and most mammals (as we are talking about here) take care of their offspring for a period of time.
[951] Regan, Tom 1983 p.89
[952] Singer 1979 p.195
[953] Bernstein 1998 pp.48ff

our own harms and benefits." Otherwise we will, according to Bernstein, never be able to recognise it as harm or benefit.[954]

He admits that it is problematic to claim that the question of another being's properties should depend on what we are able to understand. He defends his position by pointing out that he is not claiming anything ontological, but rather that a statement needs to be intelligible for us in order for us to be able to relate emphatically to it.[955]

This sounds a lot like the statement that we cannot have positive duties to human beings far into the future because we will not be able to psychologically handle such a claim. When we discussed that statement in sub-section 4.1.4, I argued that it must be enough that we can intellectually understand that they have certain interests. The same should be the case when we talk about the interests of species. That the interests we are talking about here are too different from our normal preferential interests to be able to identify with them or relate emphatically to them should not be an excuse not to consider them, as long as it is intellectually possible to understand that there are such interests. The problem is that it does not seem to be possible to make sense intellectually of how the biological needs or effective functioning we are talking about can be interests for those that have them – other than in the form of preferences or as something that has instrumental value in relation to these preferences.

Let us return to Bernstein. He points out a possible solution to the problem in the form of analogies. Those who claim that non-sentient entities have wellbeing can argue that trees, for instance, have living functions like we do. If one of our body functions is wounded it would make us worse off so we can, by analogy, make sense of the statement that a wound of a root of a tree makes the tree worse off.[956]

Bernstein's own answer is that this analogy would also work for machines, and he does not believe that anyone would agree that a machine has wellbeing.[957] It looks, in other words, like we are back at the same problem we encountered above.

Considering how evolution actually works there is also a general problem for the idea that our biological functions or needs constitute interests as such. Our biological functions are actually a result of what worked for our forefathers: That I prefer not to be hungry is not literally because nourishment is important for my biological functions but because it was important for the biological functions of my forefathers. This makes it even harder to understand how my biological functions can be what constitutes my interests.

Paternalism is something that all moral theories have to deal with independently of what constitutes the interests of the moral objects. It is, however, particularly problematic when we base interests on something other than preferences. If we assume that there are other interests such as biologic

[954] Bernstein 1998 p.50
[955] Bernstein 1998 p.50
[956] Bernstein 1998 p.51
[957] Bernstein 1998 p.51

wellbeing, and that these interests sometimes collide with our preferences, it is quite possible that in some cases someone else than the being that has the interest is the best judge of what is in the interest-bearer's interest.

Johnson admits that this is a problem,[958] and he points out that even if we build our theory around wellbeing we must — for the sake of their wellbeing — base our practical considerations on their preferences (if they have preferences). This is both because people, according to Johnson, in most cases probably are the best judges of what is good for them, because it is important for them to be accepted as the best judges of their own interests, and because we need to avoid people promoting their own interests while claiming to promote someone else's. According to Johnson, this is not a restriction of his theory. It is just a practical application of the theory built on wellbeing. We should not, according to him, let this kind of practical considerations define the concept of interest.[959]

It seems that things are a little more complicated than Johnson indicates here, however. He acknowledges that people should be allowed to make their own decisions, but he also makes it very clear that there is a limit. If it is clear that someone goes against her biological wellbeing, Johnson thinks, to a large extent, it is proper to declare the person in question mentally incompetent, and he is quite explicit that in a conflict between preferences and biological wellbeing only the latter counts.[960] This in turn means that his attempt to avoid the suspicion that his theory invites to paternalism does not make it all the way to the main target of the suspicion.

6.2.6. Self-definition and self-maintenance

One of the major problems with Johnson's, Rolston's and Morito's attempt to explain how biological wellbeing can be an interest is that their suggestions can be applicable to many other things than species and living beings. Johnson's way of dealing with that problem is to add another criteria viz. self-definition. The argument goes like this: When we say, for example, that a machine is harmed we assume that the machine has a certain role that we have defined, and it is relative to that role that it has been harmed. Something harms a tractor given its identity as a tractor if it, as a result, becomes less good at performing its task as a tractor – as defined by the owner or constructor of the tractor. If someone decides to take a tractor and make it into a work of art, it might be that exposing the tractor to things that would harm it as a tractor, would improve it as a work of art. Even in this case, its identity is decided by someone outside of the tractor. The question of whether we want to regard it as a tractor or as a piece of art is entirely

[958] Johnson 1991 pp.103, 118
[959] Johnson 1991 pp.103, 118f
[960] Johnson 1991 pp.108ff

up to us. Were this object to turn up as a "freak of nature" on an uninhibited planet, it would just be an object and it would be meaningless to talk about it as harmed or benefited. [961]

This looks somewhat like my explanation above for why computers cannot have interests. There is a relevant difference, however. I did not talk about the *identity* of the computer or about who has *defined* it. I was talking about the *perspective* from which it was harmed. Only sentient beings can have perspectives, but how about definitions? Can species and non-sentient life forms define their own identity in a way that machines cannot, and is it morally relevant whether they can?

Johnson answers both these questions in the affirmative.[962] Living beings including species and ecosystems can, according to Johnson, have assigned identities just like tractors, but they also define their own identities.[963] Living things have optimal states that constitute their interests and that are defined by the entity itself. [964] On the question of what gives living organisms their identity, Johnson uses several expressions. He tells us that an organism is "a process which hangs together. It maintains itself in a fluctuating environment which, unless countered, would terminate it."[965] He also uses phrases like "ongoing coherent organic whole, a thing-process, with past, present, and orientation and drive toward the future",[966] "integrated wholeness" or "organic unity" which in turn means that "its character is an integrated expression of its subsidiary system."[967]

What does all this mean? Johnson gives us an example: Living beings control their body temperature and the control methods are "integral features" of the system. This is not the case with mere things. Refrigerators, for example, also control their temperature, but only thanks to a thermostat that is not an integrated part of their identity as refrigerators (a refrigerator without a thermostat would still be a refrigerator), and the thermostats in turn are controlled by an exterior will (ours).[968]

It is true that a refrigerator without a thermostat is still a refrigerator, but what if we instead used the thermostat as our example? A 'thermostat' that does not regulate temperature is not a thermostat. Johnson could avoid this problem by pointing out that the thermostat is still controlled by an exterior will and it was constructed and manufactured in order to fulfil a role decided by someone outside of the thermostat.

If he uses this way out he might well go from bad to worse, however. This solution implies that the way something actually works is not enough to decide whether it is self-identifying in Johnson's terminology. If a thermostat were to

[961] Johnson 1991 pp.77ff, 145
[962] Johnson 1991 p.78f, Johnson 1992 p.150
[963] Johnson 1991 p.79
[964] Johnson 1991 p.80
[965] Johnson 1992 p.150
[966] Johnson 1991 pp.133, 157
[967] Johnson 1992 p.150
[968] Johnson 1992 p.150

turn up on an uninhabited planet as a "freak of nature" Johnson would probably say that, like with the tractor, it would not be meaningful to talk about it in terms of benefit and harm. Such a thermostat is self-regulating, and contrary to the thermostat in my refrigerator, it is not controlled by or constructed and manufactured in accordance with the will of someone else. Why then is it not a self-defining entity with its own interests and moral standing? Apparently it is not enough not to be controlled by, or constructed and manufactured in accordance with an exterior will in order to have interests. Maybe it is necessary to have a will of one's own? That suggestion sounds reasonable, but would of course be devastating for Johnson's theory since it would take us back to sentient beings as the only entities with interests. Plants and species do not have a will, so why are they not just "freaks of nature" about whom it would be meaningless to talk about benefits and harms if there were no sentient beings around?

Johnson has another suggestion for how something can define its own identity – an answer that does not presuppose sentience. The key concept here is self-maintaining.[969] A living organism can, according to this view, be seen as a process that maintains itself against an environment that would otherwise destroy it.[970] This in turn is, according to Johnson, the main interest of living beings.[971] He also claims that this characterization is applicable to both species and ecosystems,[972] and it gives them "interests in their own right."[973]

One might question whether there is no self-maintenance to be found in other things than those Johnson wants to pick out as moral objects. Janna Thompson, for instance, argues that "virtually anything can be regarded as a self-contained system … be it a liver, a molecule, or a solar system".[974]

One might also question whether species and ecosystems really work to maintain themselves. It seems more reasonable to say that they are the result of what the individuals do.

Finally one might question whether self-maintenance is sufficient for having interests.

When Johnson discusses ecosystems he asks whether "some things go on in an ecosystem because their going on serves to maintain the ecosystem".[975] Apparently he believes that the answer to this question is yes, and that it is an argument in favour of his thesis. Maybe this can be a clue to how he imagines that species can have interests in virtue of being self-maintaining.

In a way, I think the answer to Johnson's question is yes. Things do go on, both in ecosystems and in species, because they as a matter of fact maintain the system or the species in the meaning that if all or most processes that went on were pernicious to the system, then the system would crash and take the process in question with it in the fall. Therefore, if we interpret the sentence in a rather

[969] Johnson 1992 pp.150f
[970] Johnson 1992 p.150
[971] Johnson 1992 p.151
[972] Johnson 1991 p.178, Johnson 1992 pp.151f
[973] Johnson 1992 p.151
[974] Thompson 1990 p.155
[975] Johnson 1992 p.155

broad, but certainly possible way, and take it to mean something like 'some things go on in an ecosystem because they happen to maintain the system', then the answer is yes. If Johnson means something stronger than that, regrettably the answer has to be no.

The trouble is to show that this kind of maintenance constitutes an interest. It is very doubtful whether a totally blind, unintentional process can be seen as manifesting an interest, and it is even more doubtful that such a process can be seen as an interest in spite of the fact that the system behind the process does not care about the result – i.e. it does not have any point of view from which it is good or bad that the process leads to a certain result. This is still the key question, and we still lack a good answer. Even if species are self-identifying by being self-maintaining in the way Johnson claims ecosystems to be, he has not yet showed that they *care* about their existence. That a process is upholding itself in a way that is defined by the process is fascinating, but it is still nothing but a blind process. I cannot see that Johnson has showed that there is anything that can be seen as a point of view of the species from which things that happen to it can be good or bad. If an external force causes the process to deviate from its self-identified optimal state then … well then what? Why is that a bad thing for the process? It is different but why is it bad? The process might end but again – that is different but why is it bad?

Self-maintaining is also a key element for Rolston. He argues that when organisms utilise resources in their environment they do it because they value themselves intrinsically. This is also the case with species. To defend the species is according to Rolston "to defend a form of life as an end in itself."[976] He does not clearly spell out how his examples with a warbler who eats insects "and makes more warblers as she can", and falcons who eat warblers,[977] are cases of species defending themselves rather than individual organisms defending acting in certain ways that have the effect that the species is maintained.

Just like Johnson, Rolston points out that the identity and goal of a machine is defined by human beings.[978] Machines are not "self-generating" or "self-defending", and therefore they do not have what Rolston calls a good-of-its-kind.[979] An organism on the other hand defends its own life as a-good-of-its-kind.[980] It does that based on the defining information of the genetic code, which has a very special status in Rolston's theory. The genetic code is what distinguishes living processes from machines,[981] and it is what gives organisms and species their telos. The information stored in our DNA is thus not just a descriptive, but also a prescriptive code, and according to Rolston, the genetic information belongs to the species at least as much as it belongs to the individual.[982]

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[976] Rolston 1987 p.269
[977] Rolston 1987 p.269
[978] Rolston 1988 p.105
[979] Rolston 1988 pp.104f
[980] Rolston 1988 pp.101, 109, 143, 149, 151
[981] Rolston 1988 p.98
[982] Rolston 1988 pp.98f

It is true that only living beings have genes, and it does not seem unreasonable to confer the genetic code to the species as well as to the individual organisms. This means that we have a way of sorting out the kinds of things to which ecocentrists want to assign moral standing from things like computers, guided missiles and thermostats. The question is whether this difference – the possession of DNA – can serve as a basis for interests. I must admit that I have big problems in seeing DNA as a teleological molecule. DNA is a catalyst of chemical processes in living organisms but it is not fundamentally different from other molecules, and it is very difficult to see how it can be a bridge between what actually happens in an organism and what is valuable or morally required. DNA-molecules just do what DNA-molecules do, and they have no point of view from which things can go good or bad. At least, I cannot see that Rolston has established anything of the kind. I can therefore not see that Rolston's attempt would be any more successful than Johnson's.

6.2.7. Goal-direction and potential

Several ecocentrists claim that species are goal directed, and see this as a proof that species have interests: Since species tend to behave and evolve in a certain direction, they can be said to have some kind of built in goal. This goal is, according to the ecocentrists, a form of interest for species and moral concern for the species ought to be in the form of concern about that goal.

Two questions present themselves here: Are species goal-directed, and is goal-directedness an interest?

Harley Cahen answers the second question with a yes but the first with a no.[983] The explanation for the yes is that he believes that goal directedness can play the same role as sentience for pointing out what is good from the "standpoint" of the entity in question.[984]

The explanation of the 'no' is that he believes that what looks like goal-directedness is just the result of a goal-directedness in the organisms.[985] The only way a species or an ecosystem could be goal-directed, according to Cahen, is if group selection is true – something he does not believe.[986]

I think there is another problem with the claim that species are goal-directed, viz. that it is a basic tenet of evolutionary theory that evolution has no goal or even direction. It is not the case that a certain species always evolves in a particular direction. The evolution of species is decided by what happens to take place in the genes of the individuals together with a selection pressure from the

[983] Cahen 1988 pp.203, 209
[984] Cahen 1988 p.209. The inner quotation marks are Cahen's.
[985] Cahen 1988 pp.195, 207, 209
[986] Cahen 1988 pp.210ff, 215

environment – and the environment constantly changes. A property that increases the fitness of the organisms of a certain species in a certain environment at a certain period may in another environment or another period decrease the fitness of the organisms that possess it. We cannot know today what properties will be fitness-increasing tomorrow. In some cases features first evolve and then disappear.

It might be possible to avoid this problem by not including direction in the definition of goal-directedness. We may then say that even though evolution always changes direction it is still evolution. Species constantly adapt to the environment and are therefore goal-directed. This is a very weak notion of goal-directedness, however, and it is unclear how this can constitute an interest. Direction is in fact not the only thing, or the most crucial, that we have to exclude in order to be able to say that species are goal-directed. We also have to exclude intentionality and motivation in the form of expected results valued from the subjective perspective of the goal-directed entity. Maybe it is possible to talk about goal-directedness without direction and without intentionality, but these concessions make it very hard to see goal-directedness as interests.

We might be able to claim a connection between goal-directedness and interests, and we might be able to say that species are goal-directed. We just do not seem to be able to do these things simultaneously. I.e. we do not seem to be able to claim that species are goal-directed and that goal-directedness signifies interests according to the same definition of 'goal-directedness'.

Rolston does not believe that the evolution of species is just about blind forces. According to him, species have a telos.[987] He does not claim that there is a conscious power behind what happens in nature but that the telos is coded in the genes, and that the genes belong as much to the species as to the individual.[988] The species runs, according to Rolston, "a telic course through the environment, using individuals resourcefully to maintain its course over much longer periods of time."[989]

It is quite difficult to understand exactly what Rolston means by this. In particular it is difficult to understand in what way this gives the species a perspective from which things can be good or bad, on a basis of which we can have a duty to things for the sake of the species.

Val Plumwood also reasons in teleological terms. She argues that we should respect things that have "a teleology, a goal, an end, or direction to which it tends or for which it strives, and which is its own."[990] To be sentient is not necessary, according to Plumwood, since things do make a difference to teleological entities even if they are not sentient.[991] It is unclear exactly what she means by that, however. It is quite obvious that entities that are not sentient can be affected in an objective meaning by what happens to them even if they are not teleological or

[987] Rolston 1988 p.150
[988] Rolston 1988 p.149
[989] Rolston 1988 p.149
[990] Plumwood 1991 p.147
[991] Plumwood 1991 p.147

goal-directed, so she must reasonably mean something more. On the other hand, she does not believe that things matter "to" something unless it is conscious.[992]

If nothing matters *to* an entity, how can we then have a moral duty to do or not do certain things for the sake of that entity?

Janna Thompson argues against the idea that goal-directedness can constitute an interest by pointing out that some machines too, are goal-directed. This is basically the same analogy with machines as was used to criticise the idea that interests could be in the form of self-identification and self-maintenance. She takes it one step further, however, in order to get around the objection that the goals of machines but not of species are decided by humans. What she says is that even though it is human beings who decide the purpose of machines, the machines have their own way of running things and we often have to adapt our goals to fit how the machines work. Sometimes, we also find new goals when we realise what a machine can do.[993] She therefore argues that if we consider goal-directedness an interest, we can say that the good of a machine is decided by how the machine works.[994]

Plumwood does not accept Thompson's argument. She argues that the potentials and purposes of machines are still built into them by their human constructors, and not by themselves.[995] Samuelsson argues along the same lines and points out that the new goals we adopt as a result of how the machine works are still not a goal of the machine, only an accidental result of how we constructed the machine.[996]

In a way they are both correct. Even if we find new goals for a machine when we see how it works, it works the way it does because of how we built it – even though that is not necessarily in accordance with how we intended it to work. It is also the case that even if the machine actually accomplishes certain things we had not expected, these things do not become goals until we say they are. If they do not fit our interests we are not going to see them as new goals. Instead we will try to change the machine. Natural non-sentient entities like species do not work the way they do because we have built them in a certain way. On the other hand, no one has built them to work the way they do. Should we then not say that they do not have any goals at all? The fact that no one outside the entity has given it a goal does not automatically mean that it has given itself a goal even if it, as a matter of fact, has certain tendencies. Helm sums up the problem well. He emphasises the importance of distinguishing between desires and mere goal-directedness.[997] His point seems to be that the latter cannot be seen as a substitute for the former. Mere goal-directedness is, according to him, just dispositions, whereas desires are motivations in their own right because they are implicitly evaluative.[998]

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[992] Plumwood 1991 p.147. Plumwood puts the word 'to' in quotation marks.
[993] Thompson 1990 p.153
[994] Thompson 1990 p.154
[995] Plumwood 1991 pp.146f
[996] Samuelsson 2008 p.109
[997] Helm 2002 pp.14, 20
[998] Helm 2002 p.20

Another way of trying to find a telos in non-sentient entities is in terms of their potential. We can say that a species or an organism does not just have a tendency to move in a certain direction, but that it has a built-in potential to do it and that the goal of the entity in question is decided by its potential. This might be a way of explaining the telos that Rolston and Plumwood talk about: A species has a telos in the form of a potential that is built into, for example, the genetic code of its organisms. Christian Munthe discusses potentiality in non-sentient beings but he is not convinced that it can constitute an interest. He objects that the environment in which an organism lives is also important for the way the organism develops. A particular organism would for instance live longer in one kind of environment than in another. [999] One might say that the organism has both the potential to live long and to die young. Which potential that becomes instantiated depends on the environment. When the environment changes, another potential comes to the foreground. If we step in and change the environment in such a way that the organism dies earlier than it would do otherwise, why is that an interference in the potential of the organism rather than just a change of which potential becomes instantiated?

To this one could answer that the environment is not an inherent part of the organism the way its genes are. It is true that the organisms alive today have a certain genetic makeup because this makeup was well adapted to the environment in which their forefathers lived, so the environment took part in the shaping of the potential of the organism anyway, but that shaping did not work on that organism but on its forefathers. On the other hand, that still means that the potential of the organism is not decided by that organism. It was decided by its forefathers and the environment in which they lived.

If we talk about species instead of individual organisms the objection becomes even stronger. A species lives much longer than individual organisms, and it changes, as pointed out by the ecocentrists, by its environment. So again, why should human-induced changes not count as changes of what potential of the species that becomes instantiated rather than as an interference of the potential of the species?

Elliott Sober presents two other arguments against the idea that species and other natural objects have interests in the form of potentiality, or as he calls it, "natural inclinations." He points out that even if it is possible to say that a mountain will continue to be unexploited if no one interferes, it is equally possible to say that the mountain will become exploited if no one interferes in the developing plans.[1000] He also points out that most species that have existed have gone extinct, so if we base our concept of what it means to want something in terms of natural tendencies, maybe we would have to say that extinction is what species want.[1001]

Both these objections are serious and in need of an answer from the ecocentrists. If we see natural inclinations, tendencies, potentials, etc. as

[999] Munthe 1997
[1000] Sober 1986 p.185
[1001] Sober 1986 p.185

interests, how do we know how to sort the real interests out from the inclinations, tendencies and potentials that go against the interests of the organisms or the species?

It seems that we have to finish not just this sub-section but the entire section by concluding that we have not managed to find any answer that does not presuppose sentience to the question of what constitutes an interest. This in turn means that we have to conclude the entire chapter by acknowledging that we have not found any way in which species can have interests in their own right, and therefore there is no way in which we can claim that we have moral duties to preserve species for the sake of the species themselves.

7. Intrinsic value

Ecocentrists often talk about species as having intrinsic value, and they typically contrast this view with anthropocentric instrumentalism (that they invariably just call "anthropocentrism"). In general, they seem to assume that these ideas are the only alternative answers to our question, and that thery are two distinct and contradictory answers: Either species have intrinsic value, or species have merely instrumental value for human beings.

It is not obvious, however, either that we are dealing with just two alternatives, or that intrinsic value and human-based value are necessarily contradictory. In the next chapter we will look at a non-anthropocentric form of instrumentalism. In this chapter we will see that the value of species for human beings does not have to be only of the instrumental kind.

I will start by looking a little closer at the term 'intrinsic value'.

7.1. Different meanings of 'intrinsic value'

The term 'intrinsic value' seems, at a closer look, to harbour not just one but several different types of value. If we look at the philosophical literature we will in fact find that the term is used in several very different ways.[1002] Even among ecocentrists the term is used in different ways. Some philosophers (not just ecocentrists) also add to the confusion by conflating different senses of the term. Other philosophers have tried to lessen the confusion by distinguishing between different senses of 'intrinsic value': John O'Neill distinguishes between three meanings of 'intrinsic value': (1) Non-instrumental value, (2) the value something has because of its non-relational properties, and (3) objective value.[1003] Wlodek Rabinowicz and Toni Rønnow-Rasmussen distinguish between two senses of intrinsic value: (1) Final value, and (2) the value something has in virtue of its internal features.[1004] Val Plumwood also distinguishes between two senses: (1) Non-instrumental value, and (2) objective value.[1005] Tom Regan distinguishes between: (1) Moral standing, and (2) non-instrumental value.[1006] Rick O'Neil distinguishes between three senses: (1) Non-instrumental value, (2)

[1002] See Regan, Tom 1992:2 passim, and Rønnow-Rasmussen & Zimmerman 2005 passim for surveys of different interpretations.
[1003] O'Neill 1992 pp.119f
[1004] Rabinowicz & Rønnow-Rasmussen 1999 passim, Rabinowicz & Rønnow-Rasmussen 2000 passim. They suggest that we use the term 'final value' for (1) and reserve 'intrinsic value' for (2).
[1005] Plumwood 1991 p.140 She prefers to use the term 'intrinsic value' only for (1).
[1006] Regan, Tom 1983 pp.142, 235ff, 243, 263f, Regan, Tom 1998 p.51, 1992:2 pp.167, 169, Regan choses to call (1) inherent value.

objective value, and (3) moral standing.[1007] Dale Jamieson also distinguishes between three senses: (1) Value due to intrinsic properties, (2) moral standing, and (3) subjective non-instrumental value.[1008]

These authors have different opinions about which of their definitions should *really* be called 'intrinsic value'. I will not take a stand in that discussion. My aim is to figure out in what way it is morally wrong to contribute to extinction. I will therefore concentrate on whether species can have a value that is neither in the form of moral standing, nor instrumental value for other human beings, but that can help answer our question. What this value should be called is less important. I will, however, try to be as transparent as possible in my terminology. I will therefore avoid the term 'intrinsic value' and instead try to use more descriptive terminology in the following discussion.

The distinctions made by the different authors listed above overlap to a great deal but not totally. It is possible to find at least five different meanings of 'intrinsic value' in the list above (in some cases it is not altogether clear whether the authors mean the same thing): (I) Value as an end rather than as a means to something else,[1009] (II) The value something has due to its internal properties, (III) The value something has due to its non-relational properties, (IV) Value that is independent of a valuer,[1010] and (V) Moral standing. In environmental ethics, 'intrinsic value' is used primarily in three of the senses mentioned above, viz. (I), (IV) and (V). These are therefore the three types of intrinsic value I will concentrate on.[1011]

These three definitions of intrinsic value – value as an end, objective value and moral standing – are not just different ways of saying the same thing, but three genuinely different concepts. To claim that something has end value is to say that it has value independently of whether it promotes some other value. To say that something has objective value is to say that it has value independently of whether it is valued, and to say that something has moral standing is to say that moral agents have a duty to consider its interests. *Claiming or denying one of these things does not compel us to claim or deny any of the other.*

Even so, conflation is common – not least among ecocentrists. In particular, this is the case with Rolston who frequently conflates all three of these senses.[1012] In at least one instance he apparently mixes all of the first four senses mentioned in the list above: When discusses whether value is in the valued object or in the mind of the valuer, he concludes that if it is in the mind of the valuer it is the

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[1007] O'Neil 1997 pp.45f. Like Plumwood, he prefers to use ''intrinsic value' only for (1). He also talks about the intrinsic value of art as the value it has because of its non-relational properties (O'Neil 1997 p.46), so it looks like he is not distinguishing between the two senses of intrinsic value that Rabinowicz and Rønnow-Rasmussen have pointed out as being two different meanings.

[1008] Jamieson 1998 pp.47f. Jamieson uses the term 'primary value' about (2) and 'derivative value' or 'being intrinsically valued' about (3).

[1009] Also called non-instrumental, final, or end value. I will in the following use the term 'end value'.

[1010] Alos called objective value. 'Objective value' is sometimes used in other meanings but this is the meaning I will use here.

[1011] Senses (II) and (III) have not been suggested explicitly as answers to our question, but they still play a role in confusing the other 3 senses and will therefore be discussed briefly.

[1012] See e.g. Rolston 1987 pp.271f, Rolston 1988 pp.1, 150, Rolston 1994 pp.105, 192f

valuer who has value, not the valued object.[1013] Clearly this is a case of confusing the question of whether something has objective value with the question of whether it has end value. For Rolston this conflation is apparently not just an oversight. He is clearly aware that other authors have assigned subjective end value to objects in nature.[1014] He even acknowledges it as a step in the right direction compared to anthropocentric instrumentalism. He admits that referring to the subjective end value of nature "affords enormously more environmental respect and protection than weaker theories."[1015] He does not believe that it is enough, however, and he also believes that it is philosophically questionable to talk about intrinsic value in this way. His argument for the latter claim is that if the value emerges in the relation between the valued object and the valuer, the value does not exist in the valued object and is therefore not really intrinsic value.[1016] For Rolston it is important that the intrinsic value is located in the object and not in the person who values.[1017]

Here, it looks like Rolston is invoking one or possibly two other definitions of intrinsic value from my list above – viz. (II) the value something has in virtue of its internal properties and/or (III) the value something has in virtue of its non-relational properties – in order to show a necessary connection between senses (I) and (IV).

Linguistically he has a point. 'Intrinsic' seems more suitable for one of these two meanings than for any of the other three on the list.[1018] This is just a matter of naming, however. The question of whether it is reasonable to call subjective end value 'intrinsic' does not in itself tell us anything about whether it is a reasonable position – which must reasonably be the more important question.

Is there anything more to Rolston's argument than linguistics? At first glance, the relation between objective value and internal or non-relational value that Rolston seems to assume looks quite clear. The term 'objective value', the way it is most often used in the environmental ethics debate means that the value is independent of external valuers. This is sometimes stated as value that is located in the object in question and not in the mind of an external valuer or in the relation between the object and an external valuer. It therefore looks like a value cannot be truly of type (II) or (III) if the value emerges from a valuer or in the relation between the object and the valuer.

In the same way the relation between end value and internal or non-relational value also looks solid. If we value something as an end rather than as a means to something else it seems that the valuable property must be internal in the object and not depending on its relation to any external objects or circumstances.

[1013] Rolston 1988 pp.27f
[1014] Rolston 1988 pp.112ff
[1015] Rolston 1988 p.114
[1016] Rolston 1994 pp.158f
[1017] Rolston 1994 p9.163f
[1018] For this reason, Rabinowicz & Rønnow-Rasmussen suggest that we restrict our use of the term 'intrinsic value' to sense (II) (see above).

If we look at these two apparent connections together we reach the conclusion that something cannot be valuable in itself unless the value is objective.

As it turns out, however, both connections are illusions. To claim that something has objective value in the sense we are talking about here, is to claim that the value does not depend on a *valuer* that might be external to the object. This is not the same as saying that the *value carrying property* is not external. Rabinowicz and Rønnow-Rasmussen point out that the constitutive base of value on the one hand, and the supervenience base on the other are two different things. They belong to two different disciplines – meta ethics and axiology respectively. If we argue for the possibility of subjective end value we have only claimed that the constitutive base of value is located in the valuer. The supervenience base might still be located in the valued object.[1019] O'Neill essentially makes the same point. He distinguishes between the source and the object of value, and he also points out that the question of whether something has objective value is not a question of ethics, but of meta-ethics.[1020]

This looks very reasonable. To say that something is valuable due to its internal or non-relational properties is not the same as saying that the value is in the object in the meaning that it is independent of an external valuer. It is possible to subjectively value something because of its internal properties or because of its non-relational properties, just as it is possible to subjectively value an object because of something external to the object or because of its relation to something else. If something can be valuable independently of valuers, there is in the same way no contradiction in saying that it has objective value due to something external to the object including its relations to something else.

Whether something has end value also seems totally independent of whether the value giving properties are internal or external, and whether they are relational or non-relational. Rabinowicz and Rønnow-Rasmussen mention works of art that have non-instrumental value because of their relation with a certain artist, and different artefacts that are valuable because of their relation with a certain person, or a certain object or event. This is not a matter of instrumental value since we may value something because of its relation to someone or something, even if it is not a means to promote that thing.[1021]

This can be stressed even further by noting that we can value something as an end because of its relation to something that we do not value or even attach negative value to. A soldier might attribute end value to the boots he wore during the war because of their connection to a very significant period in his life – even though he hated the period in question and wished he had never have had to experience it.

To try to connect end value to objective value via connecting them both to internal and non-relational value must therefore be concluded to be unsuccessful.

[1019] Rabinowicz & Rønnow-Rasmussen 1999 pp.21f, Rabinowicz & Rønnow-Rasmussen 2000 pp.36f, 39f
[1020] O'Neill 1992 p.120
[1021] Rabinowicz & Rønnow-Rasmussen 1999 pp.23ff, Rabinowicz & Rønnow-Rasmussen 2000 p.41

The conflation of end value with objective value is not the only or possibly even the most problematic type of conflation. If we look at Rolston again, we can see that he also conflates end value with moral standing.[1022] He claims, for instance, that according to the standard view of ethics, species cannot assign value to anything and therefore they do not have intrinsic value – only instrumental value – and therefore, in turn, we cannot have direct duties to them.[1023] This is a conflation of end value and moral standing. That species cannot evaluate means that they have no interests, and therefore no moral standing in their own right. This does not mean that they cannot have value in a non-instrumental way e.g. by being valued by someone else as ends in themselves.

Another illustrative example of this conflation provided by Rolston is when he asks why we assign intrinsic value only to subjective life while we only assign instrumental value to objective life.[1024] Here again, he conflates end value with moral standing. In reality, nothing stops us from assigning end value to objective (i.e. non-sentient) life while assigning moral standing only to subjective (i.e. sentient) life.

In the same way, Rolston asks: "Why not value the whole process with all its product organisms, rather than restrict valuing to the subjective aspect of the process?"[1025] Again it seems that Rolston confuses 1. Demanding sentience when assigning moral standing, with 2. Valuing sentience

I agree with O'Neil who points out that sentience is a

> criterion for moral significance not because states of consciousness have intrinsic value, but because there is no reason to consider x's interests if x itself doesn't care about those interests.[1026]

That sentience is the criterion of moral standing is not because it is valuable (from any perspective including that of the sentient being in question – it might be but it does not have to be). It is because when someone has it, what happens to that someone becomes relevant for that someone. It seems to me that there is no contradiction in stating that a sentient organism can have moral standing due to the fact that things have value for that organism, and also state that the organism in question has no final value for anyone including itself – or the other way around.[1027] Neither would there be any inconsistency in regretting the existence of sentience, but still acknowledge that all and only sentient beings have moral standing. That things can only have value to sentient beings means that only sentient beings can have moral standing. It does not mean that only sentient

[1022] See e.g. Rolston 1987 p.253, Rolston 1988 pp.190f, Rolston 1994 passim, and the following examples.
[1023] Rolston 1988 p.150
[1024] Rolston 1988 p.107
[1025] Rolston 1988 p.111
[1026] O'Neil 1997 p.52
[1027] If someone has no or negative end value for himself we can respect his moral standing by assisting his death.

beings can have value – not even that only sentient beings can have value as ends in themselves. That an object has moral standing has nothing whatsoever to do with the value of the object. What is relevant is instead whether things have value for that object.

If we do not acknowledge the distinction between moral standing and end value we will get very confused in many valuing situations. We would, for instance, have to say about an ancient vase either that it cannot have any non-instrumental value, or that it has moral standing. Both alternatives seem absurd.

Regan illustrates the difference between end value and moral standing by pointing out that, according to mental state theories, the only thing that has value is mental states, though no one claims (and it would be a category mistake to do so) that mental states can be the objects of respect or duties.[1028] This can be generalised beyond mental states. According to Regan, a painting can have end value but we cannot show respect for the beauty of a painting. He even finds the idea unintelligible. If anything we can show respect for the painter.[1029] There is no necessary connection between the statement that X has end value, and the statement that we have duties to X.[1030]

Rolston is not the only one who makes the mistake of conflating end value with moral standing. It actually seems to be a very common mistake – made by ecocentrists and non-ecocentrists alike.[1031] Even ecocentrists who, like Plumwood and Callicott (in his later writings), explicitly deny that species have objective value, or that it is necessary to claim that species have objective value to maintain that they have non-instrumental value, tend to conflate non-instrumental value and moral standing.[1032]

Callicott never discusses the possibility of assigning end value to species without accepting them as moral objects. He just assumes that it is the same thing. This conflation in combination with his firm belief that there are no objective values, leads him to a moral theory according to which someone's or something's moral standing depends on her or its relation to the community of moral agents (who have to be human beings). This in turn means that not just human beings or sentient beings can have moral standing, but all living organisms as well as inanimate natural objects, species, ecosystems and even the Land itself. Callicott's basic tenet that something's moral status depends on its

[1028] Regan, Tom 1992:2 pp.167, 169
[1029] Regan, Tom 1992:2 p.169
[1030] Regan, Tom 1992:2 p.179 Regan uses the terms intrinsic and inherent value instead of final / end value and moral standing.
[1031] See e.g. Andersson 2007 p.3, Bradley 2001 pp.43f, Leitzell 1986 p.246, Morito 1993 p.51, Munthe 1997, Persson, Ingmar 1994 p.24, Rodman 1977 pp.90f, Rolston 1988 pp.1, 41, 57, 198, 212, Rolston 1994 pp.108, 173, passim, Schönfeld 1992 p.359, Sprigge 1991 pp.108f, Stenmark 2000 pp.75, 79ff, 103,129, Westra 1997 passim. Samuelsson distinguishes between end value (intrinsic value in his terminology) and moral standing in that only things with interests can have moral standing. On the other hand he conflates them (under the heading 'moral status') in the sense that both generate direct moral duties. (Samuelsson 2008 pp.37, 48f, 58f, 61, 66ff, 71ff. 98).
[1032] Callicott 1980 pp.318, 325, Callicott 1986 pp.142f, 153f, 160, Callicott 1990 pp.17f, Callicott 1992:2 passim, Callicott 1998 passim, Callicott 1999 pp.15ff, 33, 71ff, 79f, 84, 173f, 240f, 244ff, 324, Plumwood 1991 pp.140f. Callicott also denies that intrinsic value (in his terminology (I) and (V) combined) have to be internal (sense (II)) (Callicott 1999 p.247).

relation to the community of moral agents also means that things have different degrees of moral status – the closer the relation, the stronger the moral status. He therefore divides the world of moral objects into different communities. We have stronger obligations to members of our more immediate communities and members of more prominent communities than we have to members of more distant and less prominent communities. How we should prioritise in practice between the interests of different moral objects depends both on which community the object belongs to, and on the relative strength of the interests at stake. How to prioritise between these two principles is not clear, however. Callicott gives us several examples but it is not easy to extract a system from them, and he does not supply us with any ready-made principle.[1033]

Callicott's approach is thus not to *deny* that species, ecosystems, etc. have moral standing and *instead* affirm that they have end value. Neither is it simply an instance of ethical nihilism in its traditional form. What he is attempting is a theory that endows genuine moral standing to wholes without running the risk of downplaying individuals, and without having to claim that something can have value without being valued.

Apart from the problem of figuring out how to prioritise between the different principles of priority, it is also difficult to understand why only some things have moral standing according to Callicott's system. Why do living beings, species, etc. have moral standing but not cars, shopping malls, and other competing entities? One might think that since just about anything can be valued as an end in itself, just about anything should also be able to qualify as a moral object in Callicott's theory. The solution is probably that Callicott does not believe that cars, shopping malls etc have any interests to consider and therefore that they cannot really be valued as ends in themselves. As we saw above, however, there is no necessary connection between these things. By demanding that something has interests in order to accept that it can have non-instrumental value, Callicott ends up in the peculiar situation mentioned above of having to deny that things like ancient vases can have non-instrumental value.

The most difficult problem with Callicott's account is, however, that as long as he has not managed to show that species and other wholes *have* interests in the form of a subjective point of view from which things can be good or bad, we cannot meaningfully talk about species as being the objects of duties no matter how highly valued they are.

The conflation of end value and moral standing by ecocentrists is noted and criticised in particular by Eugene C. Hargrove, Rick O'Neil and Dale Jamieson.[1034] This particular conflation is problematic in many ways. In relation to our investigation it is especially problematic because it means that arguments that are perfectly legitimate for attributing end value to species are used to argue that we have duties to respect the interests of species, while arguments that work well against the claim that species have moral standing are said to show that

[1033] Callicott 1987:2 pp.207f, Callicott 1988 passim, Callicott 1992:1 passim, Callicott 1998 passim, Callicott 1999 pp.165ff
[1034] Hargrove 1987 pp.20f, O'Neil 1997 pp.45f

species cannot have end value. This means, which O'Neil points out, that "individualists needlessly deny intrinsic value to species, while holists falsely attribute moral standing to species."[1035]

We saw that Rolston is an example of the latter. Janna Thompson, on the other hand, is an example of the former. She dismisses the possibility of an environmental ethic after having defined it in terms of intrinsic value and at the same time conflated senses (I) and (V) of intrinsic value:

> An environmental ethic, as I understand it, is an ethic which holds that natural entities and/or states of affairs are intrinsically valuable, and thus deserve to be the object of our moral concern.[1036]

By conflating moral standing and end value under the common heading of intrinsic value,[1037] she leaves out the possibility that species can have non-instrumental value without being moral objects. This possibility is, however, taken seriously by several others who suggest that species have non-instrumental value by being subjectively valued as ends in themselves by human beings. If we accept that suggestion we are back in anthropocentrism, but the value of species is no longer just instrumental. We therefore have a possibility to extend the moral duties regarding species that we established in chapter 2 by adding end value of species to the instrumental value of species we have already found.

7.1. Subjective end value

We have seen that it is possible and legitimate to assign end value to something without claiming that the value is objective or that it means that the object in question has moral standing. End value can supervene on many different properties that are reasonably easier to find in species than interests. Several authors have suggested that subjective end value in nature is an important reason for preservation,[1038] and many different properties found in species have been mentioned as value adding. Elliot, for example, mentions "diversity, stability, complexity, beauty, harmony, creativity, organization, intricacy, elegance and richness" – each by itself or in combination, as examples of aesthetic qualities that endow end value to wild nature.[1039] Plumwood mentions "stability, harmony, diversity, and integrity" as properties that might

[1035] O'Neil 1997 p.45. By 'intrinsic value' he seems to mean non-instrumental value.
[1036] Thompson 1990 p.148
[1037] Thompson 1990 passim
[1038] See e.g. Anderberg 1994 pp.91f, Elliot 1992 pp.138, 140, 143, Fagerström 2003, Fisher 1987 p.207, Frankena 1979 p.15, O'Neil 1997 p.46
[1039] Elliot 1992 p.151

accord subjective end value to natural entities.[1040] Anderberg mentions variation and originality as examples of aesthetic values in nature.[1041] Angermeier mentions naturalness,[1042] and Elliot mentions naturalness and rarity.[1043] Rabinowicz and Rønnow-Rasmussen mention wilderness, rarity and the property of being untouched by humans.[1044] Apart from these properties, many other value-adding properties can be found in particular species.

Plumwood is not the only ecocentrist who point out properties that intuitively seem like reasons for subjectively valuing species as ends. Aldo Leopold has formulated what must be the most famous ecocentric principle:

> A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.[1045]

That something has any or all of these properties does not say anything about whether it has interests in a morally relevant meaning. All these properties seem well worthy of protection however, and an object that possess these properties seems well worthy of subjective appreciation.

Another good place to look for species properties that are perfect candidates for subjective end value is, surprisingly, in the works of Rolston. If we take a closer look at his arguments for the moral standing of non-sentient life forms, species, ecosystems, etc. we find that a substantial part of the arguments would be excellent arguments for valuing these entities subjectively as ends. He spends much time and effort describing how species and other entities in nature have all kinds of fantastic and admirable properties.[1046] Consider, for example, this exposition of why the Florida panther is worth preserving in spite of its inconveniences to human beings:

> To be gained is the continued existence of an animal handsome enough to be chosen as the state symbol, highly evolved on the top trophic rung of a rare Everglades ecosystem, thought by many to be the most aesthetically exciting animal on the North American continent.[1047]

None of this comes close to, or has anything at all to do with establishing that the species has interests to respect. Therefore, it totally misfires as an argument for moral standing, but it makes a good case for arguing that the species should be valued as an end. This is quite typical for many of Rolston's

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[1040] Plumwood 1991 p.144
[1041] Anderberg 1994 p.41 (Original: 'variationsrikedom' and 'ursprunglighet'. My translation from Swedish.)
[1042] Angermeier 2000 p.377
[1043] Elliot 1992 pp.138f
[1044] Rabinowicz & Rønnow-Rasmussen 2000 pp.41, 47
[1045] Leopold 1970 p.262. The last chapter in *A Sand County Almanac* is also dedicated to "conservation aesthetic". Callicott has analysed this side of Leopold in Callicott 1987:3 passim.
[1046] See e.g. Rolston 1987 pp.248,257,272, Rolston 1988 pp.24, 140, 160ff, 198, 228f, 344 and passim, Rolston 1994 pp.163ff, 194
[1047] Rolston 1988 p.140

arguments, and it is a good illustration of O'Neil's point: The conflation of end value and moral standing makes ecocentrists falsely attribute moral standing to species, while some of the arguments they use may be very good arguments for the totally different but still very important conclusion that species should be values as ends.

Rolston also mentions a cave section that is closed to human visitors except for the odd scientist because of some very fragile crystal formations called "angel hair". Because the cave section is closed its beauty cannot be enjoyed by the public. This in turn leads Rolston to the conclusion that it must be a case of objective value.[1048] Since we have already seen that it is possible to value things that we have no hope of experiencing, we do not have to conclude that it is a case of objective value. Instead it looks like a splendid example of something that is protected because of its subjective end value.

Especially aesthetic arguments are heavily relied upon by Rolston.[1049] He spends several pages working hard to convince the reader that all nature is beautiful. Even parts of nature that appear ugly contribute to the beauty of the whole picture.[1050] He also argues that knowledge of ecology enhances the aesthetic appreciation of nature.[1051] If it were not for his persistence that the beauty is objectively there, he would have made a very good case for the idea of subjective end value in nature.

Rolston's reasoning is particularly interesting and useful for our purpose when he describes how wildlife have properties that cannot be transferred to canvas or even to film without aspects getting lost.[1052] This makes our case even stronger since it minimizes the problem of substitutability. It shows that it is not enough to preserve species in the form of pictures (even moving pictures). Some aspects of nature have to be experienced "live" so to speak. One of these aspects is the element of unpredictability.[1053] There can obviously be elements of unpredictability in a poem or a piece of music or an exhibition, but it is not genuine unpredictability. It is a prearranged order of words, notes or artefacts that give you a sense of surprise, but you know that someone has thought it out and planned it. In nature the unpredictability is genuine due to the fact that there are several individuals and forces involved acting in real time. The next time you hear the poem or see the exhibition the element of surprise is gone but the next time you visit nature your experience will be different.[1054] Nature does not have a monopoly on this aspect. It can also be created by artistic happenings or in sports. My point is, however, not that it is unique but that there are aspects of living nature that cannot be reproduced. There is also a difference compared to sport and artistic happenings in that what happens in nature is a matter of life and

[1048] Rolston 1988 p.199, Rolston 1994 p.182
[1049] See e.g. Rolston 1988 pp.306, 346ff
[1050] Rolston 1988 pp.237ff
[1051] Rolston 1988 p.241
[1052] Rolston 1994 pp.118ff
[1053] Rolston 1994 pp.118ff
[1054] See Rolston 1994 p.139 for a description of how the element of change and surprise adds to the experience of nature.

death to a degree that sports and happenings can never come close to in a civilized society. Nature is "for real" in a way that art and sport are not.

Another important aspect are the circumstances under which the plant or animal or scenery is enjoyed.[1055] There is a large difference between, on the one hand, enjoying a photograph of a beautiful flower, and on the other, enjoying the flower on location on a windy mountaintop in thin air after having walked a whole day, spent the night in a tent and then climbed up the mountain. Another difference is that a piece of wildlife in a painting or a photograph, or even in a poem is a segment of a larger picture that not only contains what you see or hear, but also an intricate relationship between the plants or animals you see and the rest of the ecosystem they and you are in.

It is thus not possible to preserve the entire end value of species by reproducing some aspect of them in the form of photographs, paintings or film, or in the form of stuffed animals or pressed flowers in a museum. Neither is it sufficient to place instances of the animals in a zoo or a botanical garden.

If we add the intricacy and elements of surprise of the ongoing evolution to the value-adding properties of species the points above are even stronger.

There are as we see plenty of good reasons to value other species as ends in themselves, and this in turn is a good reason for those of us who appreciate these values to preserve the species. The question is: Can the attribution of subjective end value to species play a part in answering why it is *morally* problematic to contribute to extinction? The answer is yes for the same reason that instrumental value can play such a role. If a species is valued as an end by moral objects, then we (other things being equal) help destroy value for these moral objects when we contribute to extinction. We are thus not considering the interests of the moral objects as we should as moral agents. This means that we do have a prima facie duty to preserve things that have subjective end value to moral objects even though these things do not have moral status in their own right.

7.2. Some problems with subjective end value – can they be solved by objective end value?

Subjective end value taken together with the instrumental values discussed in chapter 2, present a rather strong case for arguing that the causing of extinction is prima facie morally problematic from an anthropocentric perspective. Even so, it is quite clear that a case built on the value of species for human beings cannot be as strong or far reaching as the moral duties suggested by ecocentrism, according to which the species themselves are moral objects.

[1055] Rolston 1994 p.136

When we discussed the instrumental value of species for human beings we noted that there are also several competing values of which many are quite strong. The same is true about end values. People value many other things than species and not everyone value species equally high.[1056] Leopold starts the foreword to *A Sand County Almanac* by the words: "There are some who can live without wild things, and some who cannot."[1057] There are probably many who can and maybe even prefer to live without wild things or at least with fewer wild things, at least when they have to choose between these wild things and other things they value. This means that just as with instrumental values the end value of species will sometimes be overridden by other values in a trade off.[1058] How often this happens is an empirical question and the answer to this question probably varies with both time and place.[1059]

The fact that appreciation of end value in other species is largely an "acquired taste" probably means that it will quite often lose out when it competes with values that are more easily appreciable for a larger number of people. Some species are also easier to value than others, which means that the end value of a species will not be an equally strong argument for preservation for all species.[1060] Singer points out, for example, that if only a few experts can distinguish between two adjacent species, then most other people it will probably not be consider it as important to preserve both.[1061]

Thomas Anderberg believes that we will see a decline in people's appreciation of nature because nature is disappearing and more and more people live in cities and do not have any close or regular contact with nature.[1062] Whether these things really have the effect that Anderberg suspects is also an empirical question, though I do not believe that the answer to that question has to be along the lines foreseen by Anderberg. Things that become rarer also tend to be more highly valued, and things that are exotic to us also tend to be assigned a higher value than things that are part of our everyday life (everything else equal).

In chapter two, section six, we found that species can have so called transformative value, meaning that species have instrumental value because of their ability to increase *our* ability to value them. In connection with that we also discussed Anderberg's and Radetzki's point that we can also be transformed in the other direction. We can learn to stop missing some things if we have to do without them for a period of time. I then noted that this is probably correct, but if it is a good thing for a human being to have a wider range of values, then it is still a loss, and it is better to go the other way and learn to value more things. In chapter 2, this reasoning was used to show that transformative value is a positive instrumental value for species. Here, we can note that it is also relevant when we talk about end value – since end value is the value that is produced by the

[1056] Anderberg 1994 pp.41, 51, 95, 123, 275, Callicott 1999 p.322, 337, Schönfeld 1992 p.355
[1057] Leopold 1970 p.xviii
[1058] Callicott 1999 p.322, 337, Elliot 1992 p.149
[1059] Anderberg 1994 p.115
[1060] Andersson 2007 p.9, O'Neil 1997 p.48
[1061] Singer 1979 p.204
[1062] Anderberg 1995 p.48

transformative process. What this means primarily, is that it is possible (though doubtlessly difficult) to mitigate the problems above by educating people in different ways, including exposing them to the transformative ability of wild nature. Jamieson gives some other examples of how we can bring people's attention to values in nature, even if they do not value these things to begin with. He mentions things like cultural and social processes, and education in the form of both informing and changing the way people look at and think about the thing in question.[1063] Anderberg claims that only "aesthetic illiterates" can avoid seeing that some changes of nature make it aesthetically inferior.[1064] This must reasonably mean that it is possible to change at least part of the attitudes we are wrestling with here.

Changing people's values is thus possible but it is far from easy and we will probably have to live with the fact that in many cases the subjective end value of species will be out competed by other subjective end values, and by instrumental values promoting other subjective end values.

This brings us to the question of whether we can do better by objective end values, that is, the position that even though species do not have moral standing, they do have end value that is independent of a valuer. We would be able to claim that they have end value even if people do not see it, which looks like a decisive advantage over the idea that species have subjective end value given the problems we have just noted regarding the latter position. Objective end value might also be a more palatable position for the ecocentrists who, if my analysis in chapter six is correct, have to give up the idea that species have moral standing. The step from moral standing to objective end value might be an easier step to take than the step from moral standing to subjective end value.

Unfortunately, the idea of objective end value has its own problems. First of all, it is very controversial if there really is such a thing as objective value. This has been discussed back and forth by many philosophers and I will not take part in that debate here. Instead, I will focus on three other serious problems.

The first of these problems is that even if we assume that there are objective values we still have to establish that species have that kind of value. How to do so is far from clear. Other things that exist objectively are established empirically. So far we are not been able to do that with values. This means that if we want the same standard of proof as for other statements we make regarding what is objectively the case (which seems like a reasonable position), we have to remain silent about the question of what has objective end value, including the question of objective end value for species even if we assume that objective end value exists. If we are prepared to accept a lower standard of evidence in this case, it seems that the best we *can* do is to refer to our intuitions. This means that we are back in the same position where we left subjective end value. This is not surprising considering that the arguments people tend to use when they argue that something has objective value are virtually indistinguishable from arguments used to convince people to value something subjectively. We saw, for instance,

[1063] Jamieson 1998 pp.50f
[1064] Anderberg 1994 p.52 (Original: 'estetiska analfabeter'. My translation from Swedish.)

that Rolston's attempts to establish objective value for species were in fact identical with a good attempt to convince valuers to value species subjectively. The conclusion has to be that it is no easier to establish that species have objective value than to convince people to value species subjectively.

The second problem is that even if there is value in nature that is independent of valuers, it does not follow that this value has to be higher than the value of things that are subjectively valued.[1065] This in turn implies that assigning objective value to species does not help us avoid the problem that species can be out competed by things we value higher. It therefore seems that we will not solve that problem either by shifting from subjective to objective end value.

The third and probably most serious problem is that it is not clear how to establish moral obligations based on objective value. When we talked about subjective value this was quite easy. Subjective value is per definition connected to the subjective judgement of a sentient being – i.e. to the interests of a moral object. That means that if something has subjective end value there is always a moral object behind it whose interests we have to consider. Objective value on the other hand lacks this connection – also per definition. Referring to objective value for species (as an alternative to, not as a synonym for, moral standing) therefore actually means that we disconnect the value from any moral duties.[1066] In that respect a shift to objective value would therefore place us in a considerably worse position compared to subjective end value.

These three problems seem to show that the idea of objective end value for species cannot help us. If we also consider that there is far from any consensus that they exist at all, the best we can do regarding end value is to rely on subjective end value in spite of its problems. It will not be as strong or as far reaching as ecocentrism, but in combination with the instrumental values of species that we found in chapter 2, the subjective end value of species will still produce a rather strong case for pronouncing many cases of human induced extinction immoral. We do not have to stop there, however.

[1065] Jamieson 1998 p.49

[1066] W.K. Frankena argues along similar lines (Frankena 1979 pp.15ff).

8. Sentientism

So far we have discussed two types of entities as possible objects of moral standing, viz. species and human beings. These are not the only alternatives, however. In chapter 6 we saw that consciousness is probably a necessary prerequisite to have interests in a morally relevant meaning, and therefore to be a moral object. Species are not sentient, while the typical human being is. As a result, the suggestion that species have moral standing in their own right failed, while the typical human being is the paradigm case of a moral object. Human beings are not the only sentient entities, however. Many non-human animals are sentient. Since it has become common to claim that sentience is not only necessary but also sufficient to be a moral object – sentientism as this position is sometimes called – many non-human individual animals are good candidates for being moral objects. That sentient non-human animals *are* moral objects has been forcefully, and in my view, successfully argued by many authors,[1067] and I will not kick in open doors by repeating these arguments here. Instead I will concentrate on whether moral concern for the interests of sentient non-human animals can help us answer our question of why it is morally problematic to contribute to the extinction of species.

Several authors have argued that such a concern provides an incentive for preservation of species and of nature in general (different authors have different opinions regarding how strong and far reaching it can be).[1068] Other authors have been much more negative and argued that sentientism cannot be of much use when it comes to the question of species preservation, or even that it is more contrary to, than supportive of, preservation.[1069]

Callicott is a special case. In his earlier writings he had a very low opinion of animal ethics as applied to environmental issues – and in particular to the question of species loss.[1070] In his later writings he has instead argued that animal ethics and environmental ethics have very much in common both in theory and in practice.[1071] In his 1988 article "Animal Liberation and Environmental Ethics: Back Together Again" he even expressed regret over the estrangement between animal ethics and environmental ethics for which he also partly assumed the blame.[1072]

[1067] See e.g. Clark 1977 passim, de Grazia 1996 passim, Regan,Tom 1983 passim, Singer 1993 passim, Singer 1995 passim

[1068] See e.g. Frankena 1979 pp.10f, Jamieson 1998 pp.42, 46, Melin 2001 p.141, Midgley 1992:1 pp.62f, Midgley 1992:2 p.114, Persson, Ingmar 1994 p.34, Regan, Tom 1983 pp.357, 360, 363, Regan, Tom 1992:1 pp.52, 58f, Schönfeld 1992 pp.356, 359, Singer 1993 pp.275ff, Swingland 1992 p.19, Webster 1992 p.89

[1069] See e.g. Anderberg 1994 pp.113, 120, 125, Hargrove 1992 pp.x, xxif, xxiv, Nelson 1993 pp.253, 256f, Sober 1986 p.184

[1070] Callicott 1980 passim, Callicott 1985 passim, Callicott 1986 pp.152, 155f

[1071] Callicott 1988 pp.163f, Callicott 1995 p.30, Callicott 1998 p.461. See also the new foreword to the reprinting of 'Animal liberation: A triangular affair' (the original essay is from 1980, the reprint is from 1995, and the new foreword is written 1994) (Callicott 1995 p.29f).

[1072] Callicott 1988 p.163 See also Hargrove 1992 p.xvi

Even so, he does not believe that they are in total agreement. He emphasizes that there are conflicts between concern for individuals and concern for wholes.[1073] By bringing them together as parts of the same theory he tries, however, to find a coherent way of solving these conflicts. We have different obligations to members of different moral communities. Sentient individuals, non-sentient individuals and wholes like species and ecosystems "inhabit" their own moral communities. Domesticated animals, wild animals and wholes belong to different communities and endow different duties. As we noted in the previous chapter, Callicott's theory is not built on the belief that sentience is either necessary or sufficient for moral standing. Instead, Callicott's idea is that both individuals and wholes have moral standing in their own right depending on their different degrees of "intrinsic value" for human moral agents. Callicott's theory is therefore still not a question of basing our concern regarding species on a concern for the interests of sentient animals – an approach that he is still very critical of.

8.1. Sentientism as a basis for species preservation – a construction on two pillars

The idea we are discussing here – that the moral problem of contributing to extinction at least in part can be explained by moral concern for the interests of sentient individual non-human animals – is basically built on two pillars: 1. If a species is made up of sentient animals, then doing things that contribute to its extinction is to do things that harm its individuals, and this is morally wrong because by doing that we are not properly considering the interests of the individual members of the species.[1074] 2. If a species is important (usually by having instrumental value) for sentient individual members of *another* species then we are not giving due moral consideration to the interests of these other individuals when we cause the species in question to go extinct.[1075]

[1073] Callicott 1988 p.164, passim, Callicott 1998 p.462, Callicott 1999 p.68
[1074] For suggestions along these lines see e.g. Broom 1992 p.94ff, Jamieson 1998 p.42, Midgley 1992:1 p.63, Regan, Tom 1983 pp.360, 363, Singer 1979 p.198, Singer 1993 pp.275f
[1075] For suggestions along these lines see e.g.. Callicott 1998 p.463, Fisher 1987 p.207, Norton 1982 p.28, Jamieson 1998 pp.42, 46, Midgley 1992:1 p.63, Persson, Ingmar 1994 p.34, Regan, Tom 1992:1 pp.52, 59, Schönfeld 1992 p.357, Singer 1993 p.275, Webster 1992 p.89

8.1.1. The first pillar

The first pillar supplies us with a very strong preservation incentive since any attack on members of the species must be deemed prima facie morally wrong – even when the species is not threatened. This in turn means that if we follow this approach we will not even end up in a situation where the species becomes threatened by human activities. This might be seen as too strong given how our main question is formulated. On the other hand, I think it fits very well with people's moral intuitions. Take whale hunting as an example.[1076] Many people seem to have a very negative attitude to the hunting of whales even when the species to which the whales belong is not immediately threatened. This seems to be the case also with other species whose members are sentient. In fact, some environmentalists even seem disappointed when researches find that a species is less threatened than it was believed to be or is becoming less threatened than it was, and as a result the protective regulations based on concern for the whole species are lessened. The disappointment may partly be explained by a suspicion that the species really is more threatened than investigations have found. I would not be surprised, however, if at least a part of the explanation is a genuine concern for the members of the species that is independent of whether the species is threatened.

Most species are not composed of sentient beings however, which means that most species are not covered directly by the first pillar. This has been pointed out as a big problem for the sentientistic approach.[1077] As we will see in the next section, this problem can to a large extent be dealt with by the second pillar.

8.1.2. The second pillar

The second pillar is in fact an extension of our reasoning in chapter 2. We then concluded that many species have instrumental value for human beings. Here, we simply extend the group of moral objects for which species have instrumental value to also include non-human sentient beings. This means that the group of moral objects for which the species have value becomes much larger and more diverse. Even though most individual organisms are non-sentient, the number of sentient organisms in the world is still quite impressive, and it is very likely that in comparison with humans, their interests are much more centred on basic biological needs and less on the things that tend to compete with preservation.[1078]

[1076] As Singer points out: If whale hunters change their habits to only harvesting a sustainable yield, then thousands of whales will still be slaughtered (Singer 1979 p.205).
[1077] Callicott 1985 p.367, Callicott 1986 p.152, Hargrove 1992 pp.x, xxi, Kellert 1986 p.60
[1078] Anderberg 1994 p.95

In many cases their preferences are probably also less flexible than humans and more dependent on their particular environment.[1079] It is therefore highly plausible that the inclusion of other sentient beings, as well as human beings among the stakeholders, in a trade off situation, would tip the scale quite drastically in favour of preservation. It is not just a matter of sheer numbers, however. The diversity of sentient beings in nature means that if a particular species is not instrumentally valuable for the sentient members of one species it is almost certainly instrumentally important for another. This means that extended instrumentalism reasonably endows many more species with instrumental value compared to purely anthropocentric instrumentalism. The webs of dependence relations in nature are very complex and the number of species that have no instrumental value whatsoever to any sentient being is probably very small, not to say negligible.[1080] It therefore seems that sentientism will both widen and strengthen the instrumental value of species compared to anthropocentric instrumentalism by making more species more instrumentally valuable for a larger number of moral objects.

We can also turn the reasoning around and point out that many sentient animals are very important for the function of ecosystems and for the survival of other species.[1081] Protecting sentient animals will therefore often automatically help the preservation of other species.

A possible problem is pointed out by Thomas Anderberg. He claims that if we weigh preferences on the basis of their quality rather than on any quantitative measurement, human preferences will outweigh the preferences of other animals.[1082]

Ranking preferences on the basis of their qualitative standard is controversial however. Ingmar Persson argues for instance, that the only plausible version of qualitative difference between preferences is intrapersonal. He claims that it is possible for one person to rank the importance of his own desires based on their qualities, but it is not possible to make interpersonal comparisons based on anything else than the importance of the desire for the individual who has the desire.[1083] This seems reasonable. It also seems that given the subjectivist view of desires that Anderberg professes, it is not possible to rank desires on the basis of anything else than the importance a desire has for the individual who has the desire.

One might also argue against Anderberg that normally we find it more important to satisfy basic needs than more highly sophisticated desires.

That many species have instrumental value for a *larger number* of moral objects if we follow the sentientistic approach compared to the anthropocentric approach, does not make a relevant difference from a deontological perspective,

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[1079] Anderberg 1994 p.96

[1080] See e.g. Schönfeld 1992 p.357. Norton on the other hand denies this (Norton 1984 pp.28, 30). It seems however that Norton has a rather simplified conception of the interdependencies in nature as well as a rather outdated conception of the distribution of sentient life forms on the planet.

[1081] Midgley 1992:2 p.114

[1082] Anderberg 1994 pp.97f, 125

[1083] Persson, Ingmar 1994 pp.26ff

though. According to deontological ethics, we cannot outweigh one moral object's interests by aggregating the interests of a number of other moral objects. On the other hand, negative rights are in general stronger than positive rights. The right not to be severely harmed is in general stronger than the right to improve an already good position. Trade off situations between preservation on the one hand and competing interests on the other most often means that a benefit for human beings is compared to a loss for non-humans. In most cases the preservation interest will therefore have priority according to deontological ethics independently of the number of stakeholders on either side.[1084]

When we discussed the first pillar we found that concern for the interests of sentient animals sometimes goes further than ecocentrism in its preservation demands. We can see a corresponding effect when we look at the second pillar. Meta-systems are in general more resilient than sub-systems. If an organism disappears, the species will still survive, but if the species dies, it implies that all its individuals are dead. If a species disappears, the ecosystem will probably survive, but if the system collapses, it will be a disaster for the species in the system. This means that the higher the level we are concerned about, the more things will be expendable. If we are only concerned with the future of the biosphere, we can afford to lose quite a lot of species. If we are only concerned with species, we can afford to lose quite a lot of organisms. If we, on the other hand, care for individual organisms, our preservation duties will be much more far reaching, and the species and other wholes to which the individuals belong and the species and other wholes on which the individuals depend, will in most cases also be protected.

8.2. Conflicts of interest between species preservation and concern for individuals

In spite of what we have seen above, there are still conflicts between sentientism and the preservation of species. In this section I will look at some of these conflicts.

[1084] Regan, Tom 1983 pp.286f, 360

8.2.1. Intervention to save individual animals

It seems to follow from sentientism that we should intervene and help animals that are suffering in nature. To do so can, however, in certain situations, be contrary to the preservation of the species. In particular, it seems contrary to the commonly held assumption that in order to preserve viable species, it is important that less fit individuals are weeded out by the forces of natural selection.[1085]

Both the anthropocentric Hargrove and the ecocentric Rolston refer to the policy to not help wounded or sick animals in national parks (with the exception of animals that have been wounded by humans or represent endangered species).[1086]

Rolston also mentions the case where two grey whales were trapped in the ice outside Alaska 1988 and was saved by a joint US/Soviet effort. Rolston argues that it would be best for the species if individuals who let themselves get trapped in the ice were left to die and do not get the chance to propagate their genes.[1087]

Different representatives of animal ethics react somewhat differently to these accusations. David Wilkins, veterinary advisor to the Royal Society for the Prevention of Cruelty to Animals (RSPCA), agrees that it could be claimed that to help and give medical treatment to sick or injured wild animals is interfering in the natural selection process that helps keep the population fit.[1088] Still, he stresses that: "[he] would never turn the back on a sick or injured animal. Nor would, or should, the RSPCA."[1089] Richard Ryder also seems to acknowledge a moral obligation to help wild animals with veterinary treatment, at least in principle.[1090] Tom Regan, being a deontologist, does not accept that we sacrifice individual moral objects for the common good. On the other hand, he seems to only acknowledge negative rights in relation to wild animals, and he exclaims: "With regard to wild animals, the general policy recommended by the rights view is: *let them be*!"[1091]

This clearly indicates that he is not in favour of interfering. The question here, is why we only have negative rights in relation to wild sentient animals. That is not at all clear from Regan's writings.

If one takes a utilitarian standpoint, things get more complicated. We cannot recourse to a difference between positive and negative rights, and we have to consider the total sum of good. As a result we will probably reach different conclusions in different cases. There are probably some cases where it is clear that we can interfere without causing more harm in the long run than we eliminate in the short. In most cases I suspect, however, that we will reach the

[1085] Rolston 1988 pp.55, 148, Rolston 1994 p.112, Wilkins 1992 p.79
[1086] Hargrove 1992 p.xxiii, Rolston 1988 pp.53, 182f, Rolston 1994 pp.111ff
[1087] Rolston 1994 p.110. This case is also mentioned in Ricklefs 1997 p.610f.
[1088] Wilkins 1992 p.79
[1089] Wilkins 1992 p.79
[1090] Ryder 1992 p.7
[1091] Regan, Tom 1983 p.361

conclusion that it is best to let evolution continue as undisturbed as possible, especially if we also counts the good of future individuals. Too much interference undermines the forces of evolution, which may have detrimental effects on future individuals. On the other hand, we have to be careful not to beg the question. Letting natural selection weed out whales who let themselves get trapped in the ice will eventually lead to a population of individuals with less tendency to let themselves get trapped in the ice. Whether this will be a benefit to future whales depends on whether it is detrimental to their interests to get trapped in the ice. Whether that is the case in turn depends to a large degree on whether or not there are human beings who come to their rescue. Human rescuers are today a part of the whales' environment just like ice is. In an environment with human rescuers, it is just not a big disadvantage to let one self get trapped in the ice. For short: If we really decide to intervene and help sentient animals in trouble, and if we do that consistently we will change the rules, and what would have been a weakness without us will not be a weakness anymore.

On the other hand again, this means that we will take on an enormous responsibility that I am not sure we are really ready to handle. We will make these animals dependent on us, which seems like a risky future. We also have to remember that helping some animals often means harming others. If nothing else, we will take away the food for animals who would otherwise eat the carcasses of the dead animals. This, together with the great complexity of the relations between different organisms in nature, makes me believe that there is, in many cases, a real possibility that we will cause more trouble than we resolve. If we consider this, plus the mayhem we risk by interfering in systems that we do not fully understand, the precautionary principle tells us to be very restrictive when it comes to interference, even from a strictly sentientistic perspective.

8.2.2. Intervention to save species

In some cases we have the opposite problem, viz. that preservation of species *calls for* human intervention in nature in a way that will harm sentient individuals. I am thinking of two types of situations: The behaviour of individual species members sometimes risks undermining the future of its own species, which might call for culling. Sometimes it might also be necessary to kill members of one species to ensure the future existence of another species.

Typical examples of the first situation are when a species rapidly increases its population size and thereby undermines its resource base. As an example, Rolston mentions an island in the San Francisco Bay where a deer population has

been fluctuating dramatically due to diseases and starvation in lack of predators.[1092]

An example of the second kind of situation is forest fires that kill individual organisms – even sentient organisms – but help certain species to survive in that environment.[1093] It has become more common to let such fires rage as long as they do not threaten human settlements or large economic interests. Sometimes forest fires are also started by humans with the expressed purpose of promoting some rare species.

Another example is when members of one species directly threaten the last remaining instances of another species. In cases like that, authorities sometimes interfere and cull the aggressive species in order to save the threatened species. Rolston's favourite example is that of San Clemente Island: The island is the only habitat for three endangered plant species (Malacothamnus clementinus, Castilleja grisea and Delphinium kinkiense), but the island is also the home of a few thousand feral goats. The goats eat the plants and if they are allowed to continue, the plant species will soon be gone. Some of the goats have been rounded up and relocated but a few thousand of them have been shot.[1094] Rolston also mentions Santa Barbara Island where introduced rabbits were shot to protect an almost extinct plant (Dudleya traskiae).[1095]

Callicott argues that

> to hunt and kill a white-tailed deer in certain districts may not only be ethically permissible, it might actually be a moral requirement, necessary to protect the local environment, taken as a whole, from the disintegrating effects of a cervid population explosion.[1096]

This quote is from "the early" Callicott, but he does not seem to have changed his mind on this point. Even in 1999, after he stated that animal ethics and environmental ethics have common concerns, he pointed out that protecting plant species often involves the killing off of feral animals, and that preserving a community often involves culling some of the members of the community.[1097]

Jamieson admits that there is a conflict between respecting sentient individuals and preserving species in both types of situation mentioned above.[1098] He emphasizes, however, that this does not mean that individualistic ethics always tells us to sacrifice the species. He compares to conflicts between human interests where we sometimes (presumably on an anthropocentric basis) come to

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[1092] Rolston 1988 p.87
[1093] Johansson, Birgitta 2005:1 p.237, Rolston 1988 p.147
[1094] Rolston 1988 pp.141, 182f, Rolston 1994 pp.64f. He also refers to this example when he argues that individuals should be culled for the good of the ecosystem (Rolston 1987 p.265). See also Andersson 2007 p.54
[1095] Rolston 1988 pp.141f
[1096] Callicott 1980 p.320. He refers to the same example in Callicott 1985 p.368f. see also Callicott 1987:2 p.196 where he argues that it would be wrong not to interfere when increasing animal populations threaten a biotic community.
[1097] Callicott 1999 p.68
[1098] Jamieson 1998 p.52

the conclusion that it is worth sacrificing individual human lives in order to preserve other values hold to be very high by many humans.[1099]

Ryder asks: "Should overcrowded wildlife populations be culled for their own benefit?"[1100] He does not answer the question however, and he does not address the question of whether it can be acceptable to sacrifice individual sentient animals to preserve *other* species.

Regan also mentions the question of culling, and he discusses whether it might be better that the animals die quickly from a bullet than slowly from starvation.[1101] He does not accept this as an argument for killing sentient animals, however. First, he points out that it is not always true that hunting or trapping is more humane than natural death. Whether this is the case is, of course, an empirical question, but Regan persists that the burden of proof rests on the hunters.[1102] His second objection is that this argument for killing is based on 'the principle of maximum sustainable yield'. This principle tells us that a "game-population" should be managed in such a way that the hunters can get the largest possible "harvest" from the population without decreasing the size of the "harvest" in the future.[1103] This is an argument that would fit well with anthropocentric instrumentalism, and it is clearly not a matter or respecting the moral standing of the animals. It would not be acceptable from an ecocentric perspective either, and Rolston in fact agrees with Regan that it is not acceptable to keep an overpopulation of animals just for them to be killed.[1104]

Regan also presents another argument against the idea that culling is morally preferable to starvation. He points out that starvation in a population is a general problem, but killing is very "personal" so to speak – some individual animals are sacrificed for the good of all. Regan apparently sees this as a utilitarian way of looking at things and therefore rejects that solution.[1105]

He is probably right that a utilitarian would be more sympathetic to culling, not for the sake of the species, but because it might lead to less suffering on the whole among sentient animals. Singer tells us that:

> If it is true that in special circumstances their population grows to such an extent that they damage their own environment and the prospects of their own survival, or that of other animals who share their habitat, then it may be right for humans to take some supervisory action[1106]

It thus seems that the conflict over culling is at least in part a conflict between deontological and utilitarian ethics: Is it acceptable to sacrifice some

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[1099] Jamieson 1998 pp48f. Jamieson does not use this terminology. Instead he talks about primary value and derivative value.
[1100] Ryder 1992 p.7
[1101] Regan, Tom 1983 p.354
[1102] Regan, Tom 1983 p.354f
[1103] Regan, Tom 1983 p.355f
[1104] Rolston 1988 p.90
[1105] Regan, Tom 1983 p.356
[1106] Singer 1995 p.234

individuals to promote the interests of other individuals? It can be about the interest of other members of the same species, or it can be about the interests of members of other species (including human beings).

It seems also in part to be a conflict between different beliefs regarding the empirical question of what implies the least harm for the animals in question. We saw that Regan did not believe that culling is always less painful for the animals in question than is starvation. The question is when and how often this is true. There are probably different beliefs about how these questions should be answered.

Mary Midgley notes that when an animal population starts to outgrow its habitat it is most often a result of human encroachments, but she also acknowledges that even so, we must find a way to deal with the problem.[1107] To let the habitat be destroyed is, according to her, not an acceptable solution since it will cause suffering to all animals in the area – both the members of the species in question, and members of other species.[1108] She believes that if we have to choose, the death from a bullet "often" involves less suffering than starvation.[1109] Therefore, she thinks that when a population is causing severe destruction of its environment and there is no other option, killing is required.[1110] Even so, she emphasizes that: "To legitimise culling is itself an evil, and it may risk encouraging other, much less justifiable, slaughter."[1111]

Midgley is apparently more optimistic than Regan when it comes to the possibilities of decreasing suffering by culling, but she does not specify how often or when culling is an acceptable alternative. Broom, on the other hand, seems to go along the same track as Regan. He argues that "a high proportion of the animals which are hunted will not die instantaneously",[1112] and that "a high proportion of animals which are shot will carry lead shot for a while, will die after a long period – in many cases days or weeks – and there is a substantial amount of suffering when this happens."[1113]

If culling, at least in some situations, turns out to be acceptable from a sentientistic viewpoint, the conflict between sentientism and species preservation is smaller than was first assumed. It does not disappear, however. It is one thing to accept culling when the welfare of other sentient animals (of the same or different species) is on the line, but sentientists would hardly accept the killing of individual sentient animals to preserve species of non-sentient organisms. As we saw above, Jamieson argues that the interests of some individuals to preserve things with high value – like species – will sometimes outweigh the interest of other individuals in surviving. I do not believe this will be the case in all, or even a majority of the conflicts, however.

Norton points out another problem. He argues that

[1107] Midgley 1992:1 p.65
[1108] Midgley 1992:1 p.66
[1109] Midgley 1992:2 p.120
[1110] Midgley 1992:1 p.65, Midgley 1992:2 pp.120f
[1111] Midgley 1992:1 p.66
[1112] Broom 1992 p.96
[1113] Broom 1992 p.96

> the disanalogy [between species preservation and] individual rights is not avoided by emphasizing the right to be spared unnecessary suffering and by arguing that herd culling, etc., is necessary for the survival of the herd. In order for this analogy to hold, it would, contrary to fact, have to be considered permissible for the problem of human famine to be solved by the "culling" of human populations.[1114]

I believe, however, that the moral discrepancy between culling of humans and culling of other sentient beings can be explained by the sentientists. They could, for example, point out that there are other relevant differences. Human beings tend to be more aware of what happens to them and to others, and this seems to imply that culling humans means a bigger harm to them and their kin compared to the culling of other sentient animals. Culling of humans would probably also lead to more violence since humans can defend themselves and organise themselves in a way that non-humans cannot. The sentientists could also point out that when we deal with humans there are other options at hand that cannot be used with other species, such as education, birth control and changed socio-economical structures.

Birth control in the form of contraceptives has been suggested and even tried on other species but it is controversial whether it can be used on a big scale. Midgley points out several problems:

> Now just think for a minute what that involves. Contraceptives do not grow on trees in doses of which only one would be taken by each deer each year. To do that job you would have to take in all the deer in every year, weigh and measure them and give them their dose, and feed them while you did it. By the time you had let them out you would have domesticated deer who are no longer likely to be able to fend for and defend themselves as they previously did. You would have a lot of hinds who lived without having any fawns, and nobody quite knows what effect that would have.[1115]

She also points out that it would be even less sensible to use this solution on mice and rats, and she mentions that the development of contraceptives for animals would certainly mean a lot of animal experimentation.[1116]

When all this is said, I still think there is one important reason why culling is in general not a very good solution either for the purpose of animal protection, or for the purpose of species preservation. The thing is that unless the species in question is hunted to the brink of extinction, its members will not stop breeding after the culling is done. The temporarily vacant niche will also be a "magnet" for other members of the species migrating from other areas. This means that the problem will reappear the next season or a few seasons later. Culling can

[1114] Norton 1982 p.29 note 26
[1115] Midgley 1992:1 pp.66f
[1116] Midgley 1992:1 p.67

therefore never really *solve* an overpopulation problem. The only way to solve the problem is to change the environment in which the species lives in such a way that the ecosystem can sustain itself. This in turn means that in a long-term perspective, we still need solutions that do not imply the kinds of conflict we have discussed here.

This does not mean that we will totally avoid conflicts between respect for the interests of sentient non-human animals on the one hand, and our interests of preserving species on the other. In many situations, such as those we have seen in this sub-section, there will be conflicts. There are also many other situations that we have not had room to discuss here but that will also involve conflicts. Sentientism will clearly not always lead to the same result as ecocentrism. Often, sentientism does not go as far as ecocentrism when it comes to preserving species. On the other hand, sometimes it goes further, and I think that in both cases it is actually in better accordance with most people's moral intuitions.

In the cases where there are genuine conflicts it is very important to be clear about which positions that conflict. We saw that some of the conflicts are actually conflicts between different beliefs regarding empirical questions, and sometimes the conflict is between utilitarianism and deontology. In many cases it is probably a matter of genuine conflicts of interests between different sentient individuals (human and/or other).

In *all* cases it is a matter of conflicting interests/beliefs of *individual sentient beings* – sometimes between humans and other sentient organisms, sometimes between organisms of different non-human species, and sometimes between different human beings. Based on our findings in chapter 6, we can be highly confident that it is never a conflict between the interests of individuals and the "interests" of species.

This is important because if we are not clear about what and whose interests are at stake we will never be able to find a workable way of dealing with the conflicts.

9. Summary and Conclusions

The aim of this investigation has been to answer the question of why it is morally problematic – even prima facie morally wrong – to cause or contribute to the extinction of species.

The first potential answer we investigated is also the most common one, viz. that other species are instrumentally valuable for human beings. We looked at several different kinds of instrumental value, ranging from the use of other species as raw material and fuel, via important ecosystem services, to benefiting from their ability to transform our values and thereby giving us more things to value. As a result, we found that it is indeed correct that many species are instrumentally valuable for human beings. Some species are very important. We also noted, however, that not all species are equally valuable in all cases, and sometimes it is extremely difficult to assess the instrumental value of a particular species. The instrumental values of different species also have to compete with other human values. Sometimes these other values probably outweigh the value of the continued existence of the species.

We found that in many cases we do not know enough to be sure about whether it is best from an anthropocentric perspective in that particular case to preserve the species, or to exploit it, or go through with some other enterprise that contributes to its extinction. In cases like that, it transpired that the most rational principle to act upon is probably the precautionary principle. This principle tells us that in cases where there is a high degree of uncertainty, and the values we might lose if something goes wrong are high, we need to be extra careful and in many cases even abstain from the project. This is particularly the case when the value that we stand to lose may be irreplaceable and the loss of the value is irreversible, when we are dealing with values that are systematically downplayed by other decision methods, when there is a cost involved in waiting for more facts, and when a false negative is at least as bad as a false positive. All these circumstances seem to be present when we talk about the extinction of species. We also discussed some problems with the precautionary principle, but they did not turn out to be devastating for our definition of the principle.

We also found that we have a duty to consider the interests of future generations and that these duties, in general, speak in favour of preservation – even more so than our duties to consider the interests of our contemporaries.

We could therefore conclude that anthropocentric instrumentalism provided us with rather strong reasons to consider acts that contribute to extinction as morally problematic and in many instances, even prima facie morally wrong. Even so, we had to conclude that anthropocentric instrumentalism did not fully account for the moral intuition we set out to investigate.

The next theory that became the target of this investigation was therefore a theory that assigns moral standing directly to the species, viz. Ecocentrism. We are not talking about indirect moral standing or moral standing in a way that is reducible to the moral standing of the member individuals of the species or of

other individuals. According to ecocentrism, species have their own interests that are not reducible to, and can even conflict with, the interests of individuals including the individual members of the species in question. We found, however, that there are some very severe problems with this theory. It turned out that it is not quite clear how to define 'species' and it is not quite clear in what way – if any – species exist outside of our imagination. We investigated several different answers to these questions and found that none of the answers were fully in accordance with the way ecocentrists think about species. The other main problem was that the ecocentrists have not managed to establish that species have interests in a morally relevant sense. We found that the most reasonable way of explaining what it means to claim that 'something is in someone's interest', was that it is subjectively good from the perspective of that someone. It therefore seems that one has to be sentient in order to have interests to consider, which in turn disqualifies species as moral objects.

This negative result does not mean that we have to suffice with the instrumental value of species for human beings. Apart from their instrumental value, species can also have value as ends in themselves for human beings. This means that it is still a matter of anthropocentric value, but it also means that more species will be more valuable for quite a lot of human beings. That species have end value for human beings is not enough in itself to answer our question, but the combination of end value and instrumental value will take us further than if we only consider their instrumental value.

Finally, we found that even though we have had to dismiss the idea that species have moral standing in their own right, we do not have to suffice with the value species have for human beings. There are many other sentient beings in the world apart from human beings, and it seems safe to assume that our contributions to the extinction of species in most cases go clearly against the interests of many non-human sentient beings. This is true if the species in question is made up of sentient individuals, and it is also true when the species in question is made up of non-sentient individuals that have instrumental value for sentient individuals of other species.

There are exceptions to this rule, but all in all it seems that the inclusion of non-human sentient individuals together with us humans as stakeholders in a trade off situation, will, in most cases, tip the scale drastically in favour of preservation.

While trying to resolve the remaining conflicts it is very important to be clear about the nature of the conflicts. Since ecocentrism turned out to be a non-viable alternative, we can conclude that we are not dealing with conflicts between individual interests and species interests. What we are dealing with are conflicts between the interests of individuals – in the form of instrumental value and end value for human as well as non-human moral objects.

The result of the investigation is thus, that there is not one but several explanation to why it is prima facie morally wrong to contribute to the extinction of species – and all of them are about duties to respect the interests of individual sentient animals.

It is from this insight we have to take off in our continued search for ethically viable solutions to the increasing number of conflicts between preservation on the one hand, and things that contribute to extinction on the other.

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