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Thinking through Botanic Gardens

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ABSTRACT

This essay discusses ways of thinking about botanic gardens that pay close attention to their particularity as *designed* spaces, dependent on technique, that nonetheless purport to present (and preserve) *natural* entities (plants). I introduce an account of what gardens are, how botanic gardens differ from other gardens, and how this particular form of garden arose in history. After this I contrast three ways of understanding the function of botanic gardens in the present time: as sites of recreation, of conservation or of encounter with nature. Finally I develop the idea that these gardens may serve as archetypes of collaboration with nature. I conclude that, in principle, botanic gardens can model alternative, creative new ways for human beings to relate to the natural environment.

KEY WORDS

Botanic gardens, gardens, paradise, conservation, recreation, encounter with nature, integration

INTRODUCTION

To walk through the Marimurtra botanic garden overhanging the rocky coast of Catalonia is to walk through a peculiar kind of wonderland.¹ Shortly after traversing an area planted with subtropical specimens, with some sections dedicated to endemics of the Canary Islands while other sections feature cacti from Mexico and California, I stare up to the lofty heights of Chilean palm trees and, not much further afield, at towering Araucarias from the Andes. Just around the corner I am taken back to the environment of my childhood, as I face the kind of maquis which populates the dry hills on the shores of the Mediterranean Sea.

And down the path the signs inform me that I am traversing Australian *malle*, South African *finbos*, Californian *chaparral*, and Chilean *espinal*.

Nine time zones further West, in the Strybing Arboretum, which really is another botanic garden located in San Francisco's Golden Gate Park, I find another sample of plants from the five areas of 'Mediterranean climate' of our planet, in other words, plants from countries from around the Mediterranean Sea, South-western Cape (South Africa), Southern California, and Southern and South-western Australia.² But in the Strybing garden the humid, cool air coming from the nearby Pacific also makes it possible for me to walk into a nearby, hundred-year old grove of redwood trees, very similar to the groves I know from my present-day homeland on the West Coast of Canada.

To enter a botanic garden is to enter, what Michel Foucault calls, a 'heterotopia', that is, a space that contests all other spaces and is 'as perfect, as meticulous, as well arranged as [our ordinary spaces] are messy, ill-constructed and jumbled'; it is to enter a really existing, *perfect*, space.³ Botanic gardens present us with spaces such as we would never find in agricultural or urban environments, or even in untouched nature, since it is unlikely that one would find such concentrations of diverse species, and, furthermore, from all over the world, in such limited spaces of the natural environment. These humanly arranged spaces are also different from other gardens insofar as their plant populations are not regimented merely to present us with decorative arrays, intended to please the eyes of the beholder. Botanic gardens seem highly paradoxical: They present nature to us without arising naturally, and they are artefacts without being artificial.⁴

These puzzling facts about botanic gardens may lead us to ask, what is a botanic garden?, what functions does it fulfil?, and, what may be its significance in our societies? In the following I begin by attempting to answer the questions what a *garden* is and what distinguishes botanic from other gardens. After this I propose to consider three distinct perspectives on botanic gardens. I conclude with a discussion of some of the ways in which botanic gardens may be seen to contribute toward seeing plants as subjects rather than as mere objects.

GARDENS AND BOTANIC GARDENS

What constitutes a garden *as a garden* is itself a debated matter. Frequently the notion of garden is etymologically traced to terms indicating an enclosed, or walled in, space.⁵ Since there are many gardens, however, that fail to be enclosed in an obvious manner other criteria are pursued, such as that a garden is a space that is designed, or that contains plant life, or that is open to the sky.⁶ Nonetheless, for each of those proposals counterexamples can be found, so that one may despair to find a definition and, finally, settle for a view, inspired by Wittgenstein's account of language games, according to which a garden should have *some* key features, none of which are either necessary or sufficient, though.⁷

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So, gardens are described as a kind of space that may be bounded in *more or less explicit ways*, may have plants *but need not*, may be explicitly designed *but may also be generated in less systematic ways*, and so on.⁸ Perhaps the most fundamental idea is that a garden is or has been tended, or cared for, and isn't entirely 'wild',⁹ though one may wonder about the degree of 'tendedness' necessary to speak of a garden. (Is a space which is planted with trees and vegetables at one time, and then left to itself, still a garden after one year? After five years? After ten or fifty?)

Botanic gardens are gardens, but of a special sort. Definitions found in encyclopaedias do not help much in the determination of their special character. The *New Encyclopaedia Britannica*, for example, says that a botanical garden is 'a collection of living plants designed chiefly to illustrate relationships within plant groups'.¹⁰ Another source admits that a definition of botanic garden is difficult, and eventually makes reference to a text issued by the International Union for the Conservation of Nature (IUCN), which defines it as a 'garden containing scientifically ordered and maintained collections of plants, usually documented and labelled, and open to the public for the purposes of recreation, education and research'.¹¹ A similar emphasis on function is exhibited in the *Chicago Botanic Garden Encyclopedia of Gardens History and Design*, which defines botanic gardens as 'collections of living plants that in the present day have four major functions: scientific inquiry, botanical and horticultural education, public recreation, and landscape aesthetics'.¹²

Turning to the historical evolution of botanic gardens, we may take note that they emerge out of mediaeval Physick Gardens, which were small gardens, with diverse healing plants, attached to monasteries. As argued in a magisterial way by John Prest, thereafter the discoveries in the late Renaissance of formerly unknown plants from far away lands led Europeans to self-conscious attempts to recreate the Garden of Eden.¹³ The supposition was that the lands, new to Europeans, encountered in the Americas and elsewhere, might contain the missing species originally present in the famed original Garden. An amalgamation of the notion of Eden and of mythical gardens, as described by Virgil and others from Europe's classical antiquity, led to the conflation of the idea of Eden with the idea of walled gardens which the ancient Greeks knew as 'Paradise' (a notion adopted by them after their own transcontinental travels, and their encounter with Persian culture).¹⁴

Today's botanic gardens also find their predecessors in a variety of later developments. For instance, gardens, which accumulated great diversity of exotic plants, were built and maintained as a sort of living warehouses intended to supply the expanding colonial powers, particularly Britain, with productive plants (such as cocoa and tea) for dissemination in the territories they had occupied around the world.¹⁵ Some gardens with 'exotic' plants, such as citrus trees, set up at crucial stopover places (as on the southern tip of Southern Africa), played an extremely important role in protecting British mariners from the ravages

of scurvy. Moreover, as Loren Russell mentions, ‘many of the present great botanic gardens are directly descended from private estates, where the collections [resulted from] a mix of acquisitiveness (or conspicuous consumption) and enthusiasm for natural history. [They were] equivalent to the natural history ‘cabinets’ which led to natural history museums.’¹⁶

Eventually gardens containing large collections of plants became sites for research associated with universities. With the turn toward research dependent on laboratory techniques, maintaining living plant collections became relatively irrelevant for botanical research,¹⁷ with the consequence that in many places botanic gardens lost much of their former sources of financial support.¹⁸ Most recently there has been a renaissance of botanic gardens in two independent ways, namely as recreational spaces and as sites for the conservation of endangered plant species. While botanic gardens may be suited more or less well for these functions, I propose a third type of function for these spaces, namely as models for collaborative relations between human beings and the natural world. I discuss these three perspectives next.

THREE PERSPECTIVES

a) Botanic gardens as recreational displays

Botanic gardens have been significant in European cultural recreation in diverse ways, including as inspiration for poetry.¹⁹ Due to ever-expanding urbanisation, and the concomitant shrinkage of pristine natural spaces, the idea that the collections of plants in botanic gardens be considered as displays serving recreational purposes has been gaining popularity among lay persons as well as a number of gardens spokespersons.

It was already argued in 1956 in the *American Journal of Botany* that, due to the loss of importance of botanic gardens from a purely scientific point of view, these sites be promoted for their contribution to human welfare in other ways, including as ‘facilities ... for passive, educational, cultural and meditative recreation’.²⁰ The idea that botanic gardens serve recreational purposes was echoed a year later in the same journal in an article which bemoaned that not enough was being done to reach the public. The author’s suggestion was to actively develop courses for the broad public in topics ranging from horticultural techniques to plant species recognition, thereby making ‘botany socially useful and widely interesting’.²¹

Some garden managers go so far as to advocate ‘opening the garden gates’ not just to scientifically interested laypersons and gardeners but to the clientele for ‘Gift shops, food services, weddings, memorial services, corporate parties, children’s programs and bus tours...’.²² This approach is advocated in part due to the perceived need to attract large numbers of visitors in order to maintain botanic gardens in good order (to balance the books) but also, supposedly, in

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order to 'find relevance' for botanic gardens. The end point of such trends, given the inherent potential of such gardens as tourist attractions, may lead to their assimilation to theme parks.²³ For better or for worse, these developments reflect the increasing integration, since the early twentieth century, of all goods (including cultural goods) into a global consumerist grid.²⁴

Interestingly, the idea that botanic gardens may serve recreational purposes, and even function as theme parks, is perhaps not so far removed from their original conception as re-creations of Eden. As such, the collections of plants were valued for external, religiously inspired, reasons: the reconstitution of Paradise. There certainly are significant differences in attitude when we move from conceiving botanic gardens as sites designed and stocked for the recuperation of the complete prelapsarian flora,²⁵ to perceiving them as living botanic encyclopaedias, and from there to seeing them as entertaining displays in kaleidoscopic theme parks. These approaches share, however, the viewpoint that such sites are something like living codes, archives, or museums.

The underlying theme in such approaches to botanic gardens is that some human beings, at some point in time, sought out diverse exotic and domestic species, brought them into the human, designed environment from the wild, and now the descendants of those specimens are presented to academic and lay publics alike as displays of natural forms that may be useful in some way: from the point of view of religion, or for the completion of natural history, or for recreational or entertainment purposes. From these points of view the relation between human beings and the plants in the gardens is a relation of subject to possession, that is, of *subject to object*.

b) Botanic gardens as sites for plant conservation

The shrinkage of natural spaces, insofar as it entails the elimination of habitat for wild species, has led to the proposal that botanic gardens may serve as locations for *ex situ* conservation of plants.²⁶ This second, less clearly human-centred, perspective consists in conceiving of botanic gardens as havens from the ravages of human enterprise and carelessness, which are destroying plant biodiversity at an increasingly alarming rate. The role of botanic gardens in the conservation of plant species is a debated topic, though. Some argue that the preservation of the gene pool is only possible *in situ* and that preservation *ex situ* is nonsense both 1) because of the loss of gene diversity in the relatively small populations present in botanic gardens, and 2) because such preservation is useless if the habitats from which the plants have been extracted have been destroyed.²⁷ Others, in contrast, argue that botanic gardens should be active players in an integrated strategy for plant conservation, but seek to re-orient the focus of the management of these sites.²⁸

The present strategic insertion of botanic gardens into the IUCN's plans for conservation of nature²⁹ fits well with the idea, noted already, of re-creating a

site at which the diverse species which, allegedly, once populated the Garden of Eden, may now be reassembled and conserved at definite locations under the protective eyes of human guardians (gardeners). From this perspective botanic gardens function as biodiversity reserves. Seen in this way, the relation between human beings and plants in the gardens is one of subjects, *qua guardians*, to *wards*, and the relationship may be called *stewardship*.

Seeing botanic gardens as biodiversity reserves means that the plants preserved are being held in store for some, as yet unspecified, purpose: Regeneration of species, *ex situ*? Museal display for future generations? Or, preservation for their own sake? In other words, the ultimate attitude towards plants represented by this conception of botanic gardens is not well defined, and may range from one that relates to plants as mere objects to one that treats them as full-blown subjects.

c) Botanic gardens as sites of human-nature interaction

Along the continuum just suggested, we may consider a third perspective for botanic gardens. If we take on a perspective which goes as far as possible toward the notion that plants may also be subjects,³⁰ how do we see the relationship between human beings and plants in a botanic garden? Certainly we cannot fail to see ourselves as subjects, but we do not necessarily have to relate to the non-human as mere objects. There is the possibility of conceiving the other, human or non-human, as partner, who can be engaged in cooperative or collaborative ways.³¹ In fact, gardens in general have variously been described as constituting collaborative endeavours between 'nature' and 'culture'.³² John Dixon Hunt, for instance, speaks of the garden as 'a site of conflict or dialogue', where 'the most important [among those conflicts and dialogues, concerns] its accommodation of both nature and culture'.³³ Donald Crawford, moreover, has elaborated a notion of dialectical relationship in the context of nature and art, which may well apply to gardens.³⁴

On Crawford's account, 'In a dialectical relationship, the two terms of the relation designate conflicting forces. It is common ... to apply this relation to cases in which the conflicting interaction brings into being some third object.'³⁵ Human beings typically attempt to exert control over the plants present in their gardens, seeking to suppress certain species, considered weeds, and to give support to the flourishing of others (considered useful or decorative). So gardens, *qua* hybrid spaces made by interacting human beings and plants, may be seen as the product of (relatively) conflicting forces, insofar as human beings seek to impose *their* objectives on (more or less resistant) plants inhabiting a garden. Nonetheless, all gardens (as do all artefacts) allow for gradations in the extent to which their 'materials' are allowed free expression of their characteristic or specific features. Collaboration, in any case, has to be preponderant in the relationship between human beings and plants in gardens, for these collectivi-

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ties only flourish if gardeners work *with*, rather than against, the natures of the plants living at those sites.³⁶

It may be objected that gardens need not be truly dependent on the cooperation of plants since some, such as Japanese dry gardens, do not have any plants in them at all. Botanic gardens, however, are distinct in this respect because of their unabashed commitment to its *botanic*, i.e., plant, content. Furthermore, in contrast to other gardens that include topiary, for example, botanic gardens are special because they present botanic species *as such*, allowing much freer expression to the natural spontaneity of their material: plants. (This is particularly evident in greenhouses of botanic gardens, where priority clearly is given to the physical well-being of plants over that of human beings.³⁷) In Crawford's terms one may say that (ideally) in botanic gardens a 'dialectics of nature and art is achieved through a synthesis of opposing forces, artefactual and natural, *but without either the natural or the artifactual losing its identity*' (emphasis added).³⁸

So, my proposal is that botanic gardens, *qua* sites created to present plants as such, may be seen as places that explicitly present the possibility of *collaboration* between human art and natural spontaneity. From this third perspective, botanic gardens constitute places especially suited for reflection on the relationship between human beings and plant nature; they are sites in which the human and the non-human are conceived as mutually interacting *subjects*.³⁹ In Aristotelian terms one may say that in botanic gardens human beings supply (some of) the environmental conditions as 'efficient causes', while the plants supply their species-specific 'formal causes'.

COLLABORATION WITH NATURE

There is a long tradition in the study of gardens which takes note of the collaboration necessary for their realization. Dixon Hunt has recounted how two Italian Humanists, Bartolomeo Taegio and Jacopo Bonfadio, (apparently independently) described garden art as the creation of a 'third nature' through active cooperation of human beings and nature. Garden art was thought to rival both the nature belonging to the gods (wild nature, assumed to be 'first nature') and humanly made landscapes (artefactual nature, originally called 'second nature' by Cicero), such as are created through agriculture, urbanism, etc.⁴⁰ I pursue the notion of collaboration with nature by considering botanic gardens as sites of experiments and as models.

Sites of experiments

Botanic gardens may be viewed as sites of experiments in two senses. Gardens in general are places of trials, of discovery of what works and what does not. Michael

Pollan writes 'for nature as much as for people, the garden has always been a place to experiment, to try out new hybrids and mutations'.⁴¹ This is especially true of botanic gardens since they generally attempt to accommodate species that, because of differences in climate, competition, lack of progenitors nearby, etc., would not have volunteered in the areas where the gardens are located.⁴² Botanic gardens also may be seen as experimental spaces of another kind.

Besides its reference to trials of the kind we know from the scientific context, the English term 'experiment' has the meaning of *experience*. (This meaning was common in seventeenth-century English, and also is preserved in the Spanish and French near-homonymous terms.) Consequently one may say that botanic gardens constitute sites of experiments in a double manner: insofar as new relations of plants to environment are being tried out and insofar as these assemblages afford new experiences.

We may specify these 'experiments' a little further. The collaborative experiments in botanic gardens may be perceived as operating at the single plant level, insofar as botanic gardens may seem to allow for the full expression of a great variety of specimens. This differentiates botanic gardens from other kinds of gardens, insofar as most gardens suppose restrictions in order to either fit a criterion of decorative value or some other use value, limiting thereby a) the degree to which any one plant may find expression and b) the diversity of species included. (That is, non-botanic gardens are much more likely to restrict full expression of plants through pruning, and to limit variety by relatively more narrow selections of plants.)

Gardens, of course, are more than assemblages of individual plants: they are also arrangements of space. Hence, botanic gardens may also be experiments in the reproduction of communities of plants (or of ecosystems) distributed across space in a certain way. For each type of ecosystem represented one may seek particular arrangements of space in order to create the best conditions for the expression of the interplay of species typical of really existing plant communities, representing them thereby. For example, in the new Barcelona Botanic Garden, conceived by Joan Pedrola as a network of triangular spaces (*fitoepisodios*), marshland species are portrayed in the lowest triangle, flanked by two spaces in which the most related, relatively humidity-seeking species sets are located just above it, and so on.⁴³

In any case, experimentation in botanic gardens needs to be carried out in a different spirit than in the manner promoted by Francis Bacon, who argued that we need to manipulate nature so she would give up her secrets. The experiments in botanic gardens, rather, involve plants and human beings in collaborative living situations: new phyto-adaptations are being tried out, while new experimental spaces for the encounter of human beings with plant life are being set up.

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Models

Gardens, understood as 'third nature', that is, as existing sites that are hybrids of nature and human activity, may be seen to *represent*,⁴⁴ in a general way, the potential for collaboration between human beings and plants. Given their primarily botanic content, botanic gardens turn out to be particularly poignant representations of this potentiality.⁴⁵ These gardens also point to, or signify, plant life and particular plant ecosystems, by presenting the visitors with exemplars.⁴⁶ In these ways botanic gardens may facilitate their perception as places where we can recognise plants as subjects. Such examples may, in turn, facilitate our perception of *other* spaces in our environment in which collaborative rather than merely exploitative relations with the natural world may be established. So, while the experiments in perception facilitated by botanic gardens are limited, of course, in time and space, they can serve as *models* for more extended experiments outside botanic gardens: for example, in the gardens adjoining people's homes, in city parks, and perhaps, up to a point, in the agricultural lands outside our cities.

Fortunately the notion that the collections amassed in botanic gardens should be given an educational role has taken wide root, and is echoed in a variety of programmes, both for children and adults.⁴⁷ In light of our present discussion, those programmes should be designed to take into account questions such as the following: What do we need to focus on in order to perceive botanic gardens as places in which human and plants interact *as subjects*? How may we avoid perceiving botanic gardens either as merely entertaining displays of plant collections, or as mere repositories of plant species? How should we conceive of the space in botanic gardens so that we do come to reflect on the possibility that we may be *partners* with plant life, and not just its owners or protectors?

SUMMARY AND CONCLUSION

Botanic gardens may be seen from a number of perspectives along a continuum which, at the extremes, pits human beings *as subjects* against plant life *as objects*. According to the first perspective discussed, human beings are conceived as subjects that relate to plants simply as things which are there to be known and/or enjoyed by us. On the second perspective, human beings as subjects undertake to protect plants as things that constitute part of a 'needy nature'. From the third point of view, the relationship is more even-handed: even if we necessarily have to conceive of ourselves as subjects, it opens up the possibility that plant life, as present in the botanic garden, may be conceived as another subject, since from this point of view the focus is on the *interaction* of collaborating, and hence reciprocally influencing, entities, each with its own integrity.

Botanic gardens offer themselves as sites of experiments instantiating collaborations between human beings and plants. Those exemplifications of collaboration between plant life and human beings can serve as models for places in which our own creativity and the spontaneities of plant lives can mesh in mutually generative, rather than destructive, ways.⁴⁸

Aldo Leopold claimed that we need to develop a land ethic such that *homo sapiens* change 'from conqueror of the land community to plain member and citizen of it'.⁴⁹ By conceiving of ourselves as subjects facing the other beings of the natural world as mere objects we divorce ourselves from that non-human part of our world, turning ourselves into aliens in the land. Botanic gardens, as models of another form of cohabitation with nature than the exploitative, may help us find a home among the other species of the land.⁵⁰

NOTES

This paper began in conversations with Joan Pedrola. I am indebted to him for his encouragement in pursuing this topic. I am grateful for helpful and encouraging comments by two anonymous referees, as well as to several kind correspondents who suggested some of the bibliographical material. I further pursue the idea that we can develop a collaborative relationship with the natural world in *Encountering Nature: Toward an Environmental Culture* (forthcoming).

¹ See <http://www.jbotanicmarimurtra.org/>

² See <http://www.strybing.org/>

³ Foucault 1986, p. 27.

⁴ In these ways they share some to the inherent ontological tensions also present, for example, in restored landscapes and Japanese gardens. See Heyd 2002. Prof. Frank Felsenstein of Ball State University points out that 'the cabinet of curiosities', which 'was highly popular among literati and men of science in the seventeenth and eighteenth centuries' could also 'be described as 'artefacts without being artificial' (Letter Frank Felsenstein to Thomas Heyd, 19 May 2005).

⁵ See van Erp-Houtepen 1986.

⁶ See, for example, Miller 1993, ch. 1; Ross 1988, ch. 2; Hunt 1998. Also see Leddy 1988. Further of interest is Turner 2005; I owe this suggestion to Beverly Brown.

⁷ See Ross 1993, who argues similarly.

⁸ Which features are considered 'key' depends on the cultural particularities of the society, which is involved in the creation of the space in question, as well as on the purposes of those discussing the concept. In short, the notion of what counts as a garden is dependent on interpretation in a thoroughgoing way.

⁹ I owe this insight to John D. Ambrose (Letter John D. Ambrose to Thomas Heyd, 26 May 2005). Also see Pollan 1992.

¹⁰ *New Encyclopaedia Britannica: Micropaedia*, 407–8, p. 407.

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¹¹ *New Royal Horticultural Society Dictionary of Gardening*, 374–77, p. 375, citing Botanic Gardens Conservation Secretariat, *Botanic Gardens Conservation Strategy* (International Union for the Conservation of Nature [IUCN] Botanic Gardens Conservation Secretariat, 1989), no page number indicated. As Ambrose points out, the documentation of plant collections in botanic gardens includes information on the wild source the specimens come from, the verification of identity performed, how they survive hard winters, etc. These matters provide an important, ‘basic distinction from a show garden’ (Letter).

¹² Sim 2001, p. 172.

¹³ John Prest, *The Garden of Eden: The Botanic Garden and the Re-Creation of Paradise* (New Haven: Yale University Press, 1981).

¹⁴ Ironically, Eugene Hargrove (1988, p. 83) argues that the introduction of exotic species into European gardens forced ‘garden enthusiasts to accept new and wilder standards of beauty’.

¹⁵ See Drayton 2000; Brockway 1979. But see Endersby 2000 for other motivations in the creation of botanic gardens. Also see Maldonado Polo 2000.

¹⁶ Letter Loren Russell to Thomas Heyd, 24 May 2005.

¹⁷ Russell (Letter) thinks, though, that ‘it’s correct to say that current research is MORE dependent on living material than in the past [when dried herbarium material sufficed for much of the published work]. However, the current research is often narrowly focused, so that living material is acquired or grown, then disposed of after the project is completed. Increased ease of travel has also made it seem inefficient to maintain material for future research – in theory you just go out in the field when you need something. ... the historic maintenance of living collections was more often justified for teaching purposes, particularly at the undergraduate level. Also it was often based on very cheap labor and little capital investment. That’s all changed, making it now difficult to obtain support.’

¹⁸ An early twentieth-century account of the history of, and functions attributed to, botanical gardens may be found in Hill 1915; for a more recent assessment see O’Malley 1992.

¹⁹ For instance, see Hassler 1973, ch. 2. Also see Sterns 2002.

²⁰ Seibert 1956, p. 738.

²¹ Avery 1957, p. 271.

²² Robinson 1996, p. 20.

²³ Botanic gardens certainly distinguish themselves from the type of theme parks, epitomised by Disneyland, which simulate the real world with fake materials, but may approximate their intent simply to entertain. For discussion on theme parks such as Disneyland, see Eco 1986. For discussion of the terms ‘simulacra’ and ‘simulation’ see Baudrillard 1988. He argues that much of our contemporary, human-made, world is becoming something akin to such theme parks. Also see Heyd 2000.

²⁴ Russell (Letter) mentions that ‘there’s another “purpose” for gathering rare plants – commercial introduction of ornamental [or sometimes edible] plants’. He points out that some horticultural directors of botanic gardens ‘have been able to finance a more traditional collection by building “name labels” for their introductions. For instance, Denver Botanic Garden releases “PlantSelect” forms through the large Colorado nursery business, and in return gets some support for exploration for new plants.’

²⁵ I.e., the full set of flora we suppose existed in the Garden of Eden before ‘The Fall’ into sin of humanity.

²⁶ As proposed by the International Union for the Conservation of Nature (IUCN) and the World Wildlife Fund (WWF) in their *Botanic Gardens Conservation Strategy*.

²⁷ Melzheimer 1996. Also see James Folsom (1996), who asks whether conservation for reintroduction is a realistic and ethically defensible goal. Folsom also raises ethical concerns about collecting plants in general and specifically in foreign countries.

²⁸ See Maunder et al. 2001. John D. Ambrose points out that ‘a third reasonable view is that *ex situ* must only be seen as a short term pursuit, in the context of the larger task of restoring habitats and getting the species in question back in nature – the ark is of little use if it is not steered back to land. If they are not reconnected back to nature then they are essentially the “living dead”’ (Letter). Also see Ambrose 1991.

²⁹ See IUCN’s and WWF’s *Botanic Gardens Conservation Strategy*.

³⁰ See Pollan 2001 for an interesting attempt to think of plants as subjects. For a discussion of nature as subject in a wider sense, see Katz 1997. Also see Heyd 2005a.

³¹ Also see Passmore 1974, especially chapter 2, where he discusses a tradition in European thought that posits the possibility of human ‘cooperation with nature’ pursued for the joint good of human beings and non-human nature. He points out that ‘to “develop” land, on this way of looking at man’s relationship to nature, is to actualise its potentialities, to bring to light what it has in itself to become, and by this means to perfect it’ (p. 32). Passmore (ch. 2), moreover, gives an historical account of the idea of cooperation with nature, pointing to its mostly Pelagian origins, and refers to further development of it in modern times by J.G. Fichte, P. Teilhard de Chardin and Herbert Marcuse.

³² My view is that nature contrasts with human-made artefacts rather than with culture, but I cannot expand on this topic here. See Heyd 2005b. Also see Pollan 1992, and Ambrose and Kock 1993.

³³ Hunt 1998, p. 272.

³⁴ Dialectical relationships generate new, and possibly interesting, resolutions from opposing or contradictory elements. The need to protect one’s own interests and the desire for good neighbourly relations may generate the impulse to agree to compromises that may not have been there before, for example.

³⁵ Crawford 1983, p. 49. I am indebted to Tom Leddy for drawing my attention to Crawford’s paper as a reference point for this essay.

³⁶ Mara Miller (1998, p. 279) cautions, however, that the term ‘collaboration’ ‘is appropriate only if one recognises that it implies in the garden a response or an interplay of a very different kind than is found among human collaborators’ because of the lack of intention and judgement present in the natural forces which are active in gardens.

³⁷ See, for example, Wright 2003, who boldly states that ‘The requirements of plants take precedence over the comfort of human visitors in a greenhouse environment.’

³⁸ Crawford 1983, p. 57.

³⁹ Also see Hargrove 1988, p. 83, who says of the nonformal garden, resulting from the import of botanical specimens to Europe, that ‘the plants were elevated to the status of self-contained and self-organizing entities worthy of admiration and study for their own sake’.

⁴⁰ Hunt 2000. Also see Cicero, *De natura deorum* 2.152 (Venice, 1508; Paris, 1511; Basel, 1531); also found in *Cicero’s Three Books Touching the Nature of the Gods* (London, 1683).

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⁴¹ Pollan 2001, p. 185.

⁴² But see Robertson 1996, who argues for the importance of native plants in botanic gardens, even weeds!

⁴³ Joan Pedrola's triangular grid system brings together strict scientific taxonomic considerations, on the one hand, and schematic models of the geographic distribution of plant ecosystems, as found in their original natural spaces, on the other. See Pedrola 1992. Also see Brown 2001. The triangular grid system of the Jardí Botanic de Barcelona originally was conceived by Pedrola, while the landscape architecture was realised by Carlos Ferrater and José Luis Canosa.

⁴⁴ At least up to the invention of the English landscape garden, gardens often were explicitly constructed with representational functions in mind: the main areas were meant to represent the hierarchies present in human society through regular, easily surveyed patterns, while mazes, for example, stood for forests and, in general, the wild. See Hunt 2000; also see Ross 1993.

⁴⁵ See Katahira 2003, *passim* and p. 83, for a critique of garden appreciation through the imposition of some external code because it may lead to the loss of 'specificity'. The approach proposed here does not commit this fault, though, since it proposes to move from the specific to the general and not the other way.

⁴⁶ It can be argued that gardens represent their constituents through what Nelson Goodman (1972) has called 'exemplification'. See Goodman's distinction between denotation and exemplification as two modes of reference or representation.

⁴⁷ See for example 'Biodiversity—A New Education Programme Devised by the University of Oxford Botanic Garden', *Journal of Biological Education*, Vol. 30, No. 1 (Spring 1996), 7–8; Bennett 1988; Hammatt 2001. Beverly Brown (Letter Beverly Brown to Thomas Heyd, 8 June 2005) has allowed me these insights from her teaching experience: 'I tell my students that every plant has a story to tell. Most of us aren't very good at "speaking plant" and don't understand what they are trying to tell us. (Is it a dry climate, moist? good nutrition? sufficient pollinators or none? fruit dispersed by wind? animals? a hard climate to live in?, etc.)'

⁴⁸ Also see Robertson, who claims that the botanic garden is 'uniquely suited to address...our relationship to nature' (p. 17). Moreover, see Shoemaker 1994.

⁴⁹ See Leopold 1995, p. 143.

⁵⁰ Interestingly, it seems that simply being present in botanic gardens can have a positive effect in stress reduction. See, for example, Kohlleppel et al. 2002.

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