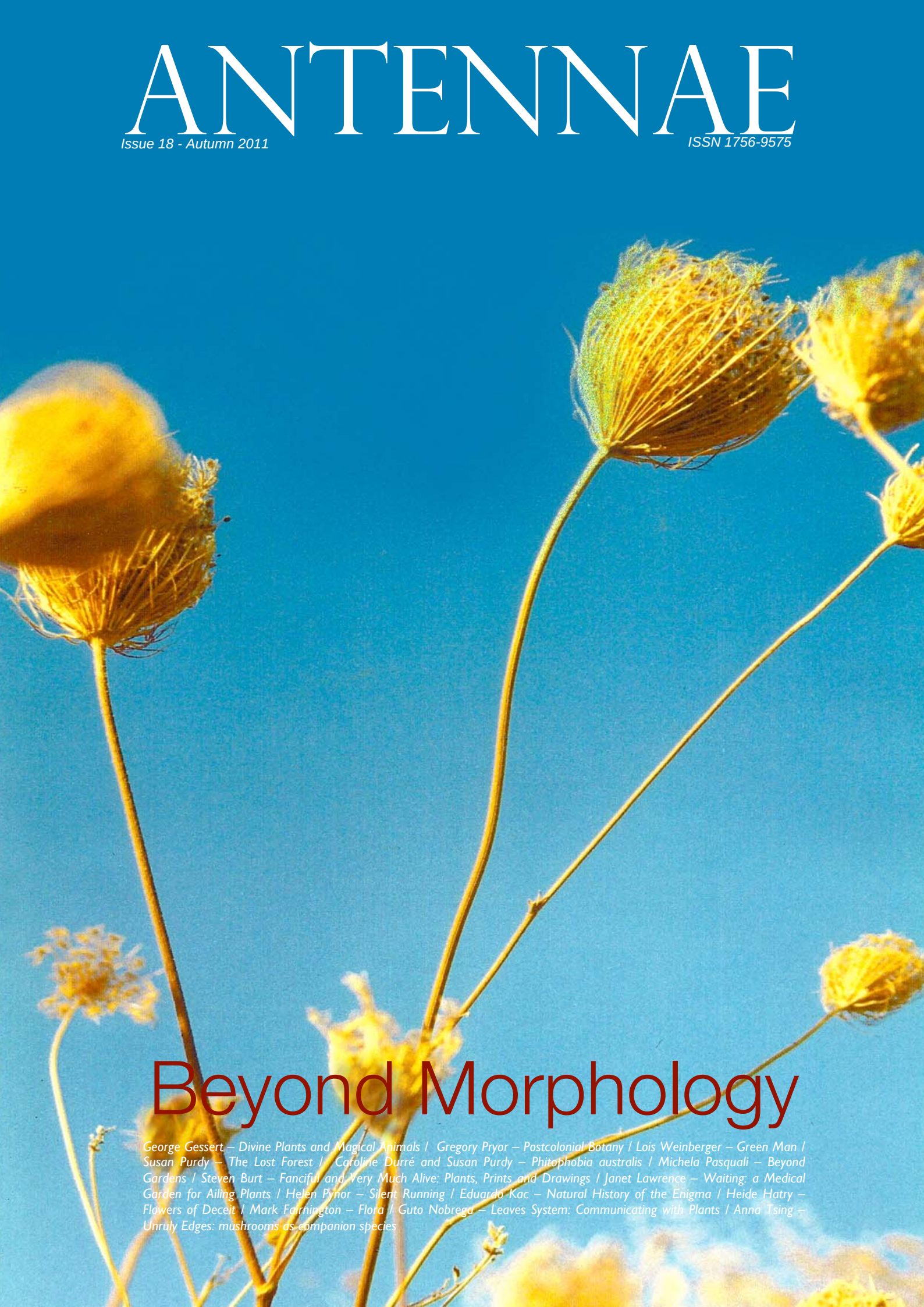
ANTENNAE

Issue 18 - Autumn 2011

ISSN 1756-9575



Beyond Morphology

George Gessert – Divine Plants and Magical Animals / Gregory Pryor – Postcolonial Botany / Lois Weinberger – Green Man / Susan Purdy – The Lost Forest / Caroline Durré and Susan Purdy – Phitophobia australis / Michela Pasquali – Beyond Gardens / Steven Burt – Fanciful and Very Much Alive: Plants, Prints and Drawings / Janet Lawrence – Waiting: a Medical Garden for Ailing Plants / Helen Pynor – Silent Running / Eduardo Kac – Natural History of the Enigma / Heide Hatry – Flowers of Deceit / Mark Fairnington – Flora / Guto Nobrega – Leaves System: Communicating with Plants / Anna Tsing – Unruly Edges: mushrooms as companion species

ANTENNAE

The Journal of Nature in Visual Culture

Front Cover Image: Giovanni Aloi, *Untitled*, 2010 © Giovanni Aloi

EDITORIAL

ANTENNAE ISSUE 18

Following the success of our previous instalment entirely dedicated to plants and contemporary art, *Antennae* is back to the botanical world with an even richer and more generous offering. Artist George Gessert, author of the book *Green Light*, in which he explores the role that aesthetic preferences have played in bioart, opens this issue with the topic of divine animals and plants looking at the dynamics of domestication. In Autumn 2010 *Antennae* launched an experiment called *The Silence of the Plants.* Triggered by the publication of a newspaper article on the subject of plants and ethics published on *The New York Times*, a challenging discussion amongst some of *Antennae's* readers, contributors and board members emerged. The article titled 'Sorry vegans, Brussels sprouts like to live too' is an intentional provocative and challenging piece that pushes a number of relevant buttons from vegetarianism/veganism to sentient/non-sentient qualities in plants and animals and asks broader questions about animal and plant life alike.

From this discussion, the issue moves on to focus on the subject of conservationism, national identity and botanical heritage through the work of Gregory Pryor, the artist whose co-curatorial contribution has much influenced the development of *Antennae*'s botanical investigation. An exclusive interview with international artist Loise Weinberger maintains the focus on the Australian botanical world. Weinberger states, that "the way that a society treats plants is a mirror image of itself." His concentrated spaces for that which is marginalized, unpleasant and driven out of public awareness impart to the viewer a mental space of reflection and define a physical site in which aspects of naturalness and liveliness become visible and supersede all regulatory strictures. Weinberger thus repudiates the classical concept of art, customary work-forms and traditional artistic locations. The photograms of Susan Purdy further explore these concepts addressing the fact that as an immigrant people Australians have not been reconciled to the given vegetation of their continent; they have been driven by an implacable desire to remake the land, to force it to conform to an unattainable ideal.

The clash between nature and culture is then explored by Michela Pasquali, landscape designer and editor of the book series *Oltre I Giardini (Beyond Gardens)* who takes us through a very interesting journey of urban green and the challenges involved in the designing of truly eco-friendly and community-friendly green spaces in the city. The issue then focuses on plants and representation through the work of Stephen Burt who invents "natural" forms that often cast plants as central dramatic figures, re-imagining rather than replicating the social relations of species. Unabashedly rich in detail and colour, his prints and drawings reveal the artist's lifelong fascination with "the curious and the small" as well as his years of studying and copying Old Master prints. The historical thread is expanded by Janet Laurence's *Waiting: a medicinal garden for ailing plants*, a major installation for the Sydney Biennale of 2010, loosely imagined as a medicinal garden but one where the onus of care has shifted. Instead of the simples and herbs of the European pharmacopeia, *Waiting* sheltered a range of Australian native plants, some healthy, some ailing, and others dead. The theme of otherworldly plants is presented in Helen Pynor's photographs somewhat reminiscent of the final scenes of the 1972 film *Silent Running* in which Earth's last remaining forests are secured in greenhouse-like geodesic domes outside the orbit of Saturn.

This issue of *Antennae* draws to a close on the controversial work of transgenic artist Eduardo Kac and his recent experimentation with plants that led to the creation of human-plant hybrids called *Edunia*. The blurring of boundaries between animal and plant is further problematized by the photographic work of Heide Hatry, where nothing is what it seems. Should you not wish to go as far as 'becoming plant' you may want to try talking to one through the work of Guto Nobrega's, *Leaves System,* which attempts to establish interspecies communication between humans and plants through electric conductivity. The issue comes to a close with the breathtaking new body of work by Mark Fairnington, an artist who has dedicated his painting career to the hyperrealist interpretation of animal specimens in natural history museums and that has too embraced the subject of plants. But the last word is that of Anna Tsing and her challenging ideas on mushrooms. We well know that mushrooms are not plants, but let's face it, it does not seem likely that a full issue of Antennae will be dedicated to the subject soon, so it seemed plausible to at least feature it here, if only by proxi. And to make this issue of *Antennae* extra special, we also have our first ever supplement. *The Urpflanze*, takes his title from the primal/primordial plant - is Goethe's imaginary plant that contains coiled up within it, the potential to generate all possible future forms. The supplement is the brainchild of Melanie Jackson, Lecturer at the Slade School of Fine Art and Esther Leslie, Professor of Political Aesthetics at Birkbeck.

Lastly, don't forget: a weed is a plant in the wrong place, just as much as a pest is an animal in the wrong place. Or, according to Ralph Waldo Emerson, a weed is "a plant whose virtues have not yet been discovered".

Giovanni Aloi
Editor in Chief of Antennae Project

Giuseppe Arcimboldo
La Primavera, 1537, oil on panel

CONTENTS

ANTENNAE ISSUE 18

DIVINE PLANTS AND MAGICAL ANIMAL

Humans have bred plants and animals with an eye to aesthetics for centuries: flowers are selected for colorful blossoms or luxuriant foliage; racehorses are bred for the elegance of their frames. Hybridized plants were first exhibited as fine art in 1936, when the Museum of Modern Art in New York showed Edward Steichen's hybrid delphiniums. Since then, bio art has become a genre; artists work with a variety of living things, including plants, animals, bacteria, slime molds, and fungi.

Text by George Gessert

Domestication occurs when two species evolve mutually beneficial (although not necessarily equal) relationships, and at least one of the partners can no longer complete its life cycle optimally except in association with the other. The phenomenon may emerge slowly or be swift. Plants can leap into domestication in a single generation, which happens fairly often through elimination of reproductive barriers in cultivation. For example, in the wild, *Iris douglasiana*, a clump-forming species of Pacifica iris that grows along the coasts of Oregon and California, never crosses with *Iris munzii*, a tall, broad-leaved and large-flowered species endemic to a small area in the southern foothills of the Sierra Nevada Mountains. The ranges of the two species do not overlap. However, the species will hybridize in gardens. New and sometimes very attractive hybrids result, ones that exist only in association with humans. These hybrids are fertile but cannot survive outside cultivation.

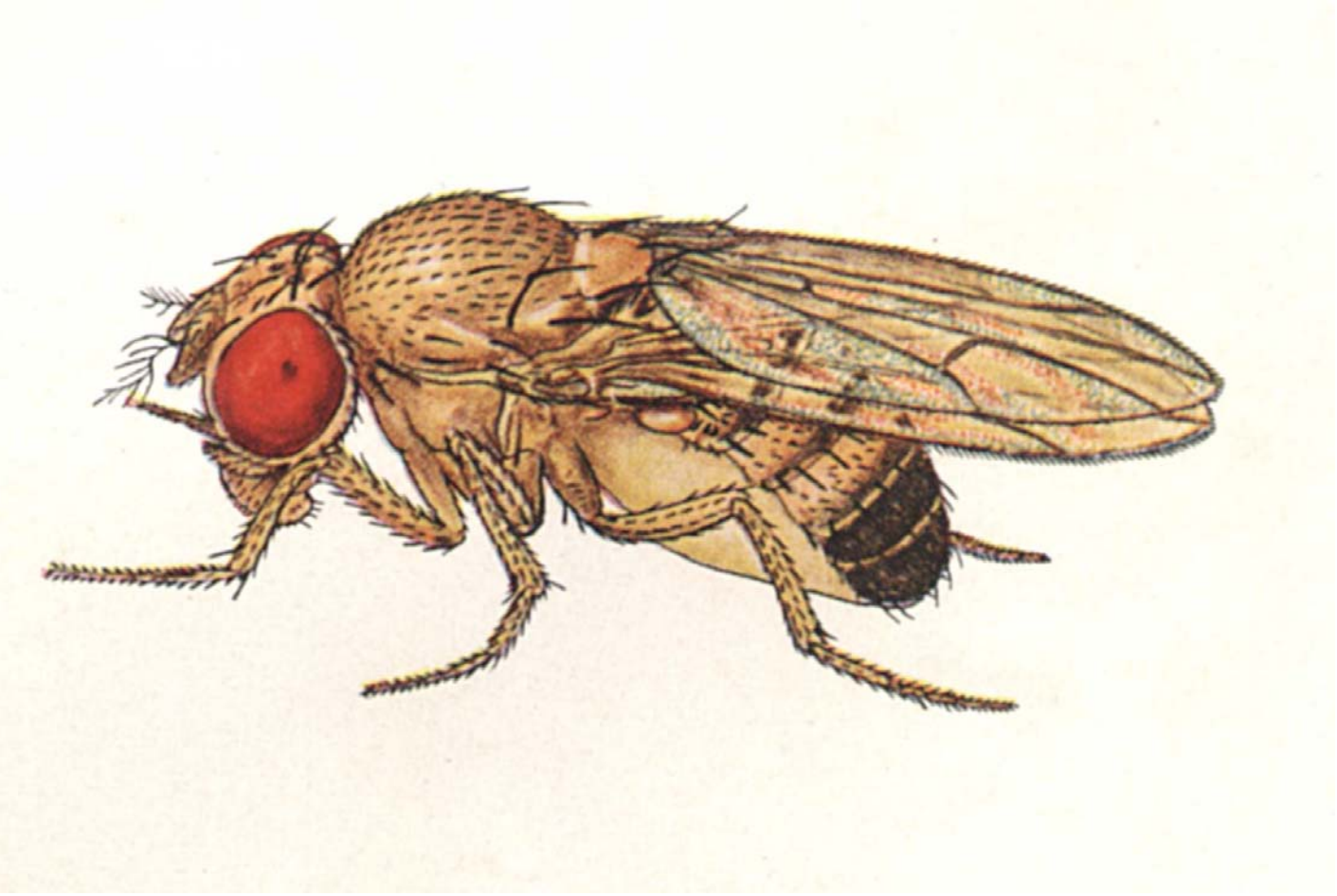
Domestication of this sort is not always a result of cross-pollination by humans. Cross-pollination in gardens is often carried out by insects. There is nothing necessarily deliberate or conscious about the emergence of new domesticates.

Domestication is not something that only humans accomplish. Approximately forty species of leaf-cutter ants cultivate fungi. The ants harvest leaves and bring them underground to serve as substrates for the fungi. Like human farmers, the ants destroy pests and weed out competing organisms. Different species of leaf-cutter ants cultivate different fungi, which in most cases are not known to exist independently of the insect. This form of domestication probably first evolved tens of millions of years ago, which means that ant fungi have been domesticated hundreds or thousands of times longer than dogs, the oldest human domesticates.

Archeological evidence indicates that humanly domesticated plants existed at least 10,000 years ago, although the actual beginnings of domestication may go back much farther.[1] Contrary to popular belief, humans almost certainly did not domesticate plants and animals only to alleviate hunger. Hungry people would not have had the time or energy to undertake long-term, uncertain experiments in selection. Critical early stages of domestication probably unfolded among people who were well-fed.[2]

Some early stages of domestication may have been impelled by aesthetics, compassion, and belief in magic. Carl Sauer, a geographer who studied the origins of domesticated plants and animals, believed that hunter-gatherer women commonly kept baby animals that had been found in the wild.[3] Baby animals arouse curiosity, delight and compassion. At some point certain of our Paleolithic forebears moved from caring for immature animals to keeping them into adulthood and allowing them to reproduce.

Reproduction in association with humans is



Drosophila melanogaster (image in public domain)

a crucial step toward domestication.

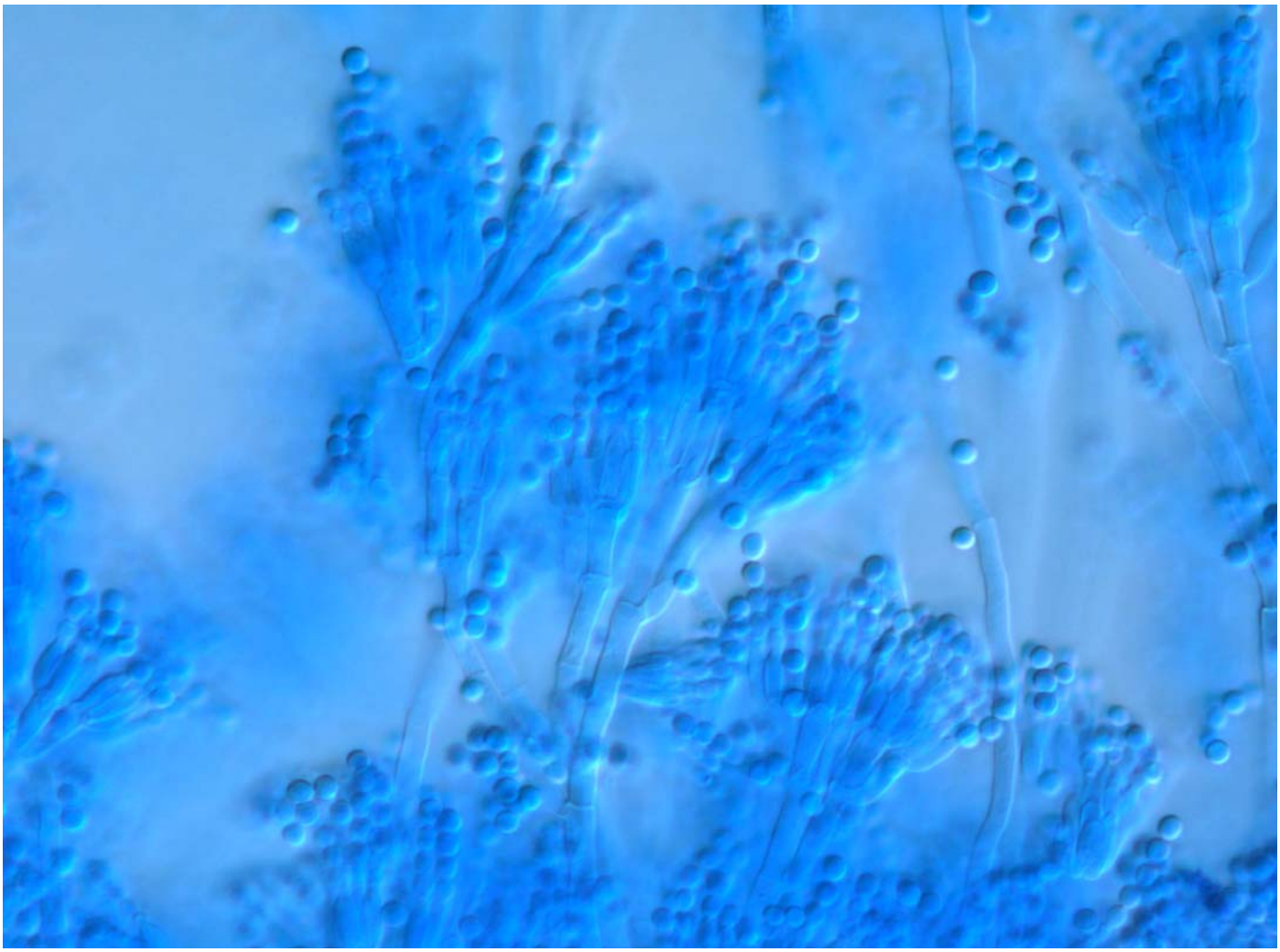
Other organisms may have been deliberately selected for use in religious ceremonies or to produce magical substances. Sauer drew particular attention to turmeric, a tropical plant in the ginger family. Turmeric grows only in association with humans. Its origins are unknown, although Southeast Asia may have been its original home. Sauer suggests that turmeric was domesticated in the remote past to provide coloring for bodies, clothing, and food. Its use as a spice came later. In Southern Asia many people still believe that turmeric has the power to enhance fertility. This power is associated with its rich golden color, the color of the sun.[4]

Color may have played a role in the domestication of animals as well. The first domesticated chickens may have been rare variants with black skin and bones that were used in magic. Raising chickens for eggs and meat came later.[5]

Whether or not Sauer is right about the earliest domesticates, recent domestications follow the pattern that he described. Almost all domestications in the last 500 years have been accomplished by economically secure people directing evolution out of curiosity or in search of luxuries or aesthetic pleasure - especially aesthetic pleasure. Of the hundreds of species domesticated in the last half millenium, the overwhelming majority are ornamental plants. So many species of ornamentals have been domesticated that they now outnumber all other domesticates combined.

Animals domesticated in recent times include minks, chinchillas, and foxes, whose furs are used to announce social status and display wealth - hardly basic necessities. Roughly a score of species have been domesticated as fanciers' animals, kept primarily for their aesthetic qualities. Among these animals are guppies, tetras, swordtails, angelfish, and canaries. Some of these also serve as pets.

Scientists have domesticated a number of species for use in laboratories. These organisms might seem to be exceptions to the rule that domestication begins with nonessentials, except that science is often as much an expression of curiosity as of basic needs. Take the little fruit fly, for example. *Drosophila melanogaster* was first experimentally bred in 1901, and immediately proved valuable for genetic research. Fruit flies have yielded information about genetics that has revolutionized agriculture, horticulture, animal



Penicillium chrysogenum (image in public domain)

breeding, and medicine, but pioneer geneticists, even if they envisioned such things, could not have been certain that they would actually come to be. Initially the science of genetics, along with its tiny, winged workhorse, benefited no one except for a few academics. *Drosophila* geneticists repeated an ancient pattern: when a plant or animal is first domesticated, it benefits only a few people, and they do not survive by eating the organism.

Much the same is true even of recently domesticated food plants. In the last 500 years, humans have domesticated several dozen species of food plants. Among these are grapefruits, pecans, blueberries, cranberries, sea buckthorns, strawberries, blue honeysuckles, American elderberries, and muscadine grapes. [6] Some of these produce nutritious food and have become economically important. However, before any plant can make a significant contribution to diet, people must modify their eating habits, which are notoriously resistant to change. In the United States the usual path to widespread acceptance of food from a newly domesticated plant is though the food's use as a novelty item, gourmet indulgence, flavoring, or dessert - as a nonessential, in other word.[7]

Only a dozen or so species domesticated in the last few centuries have been significantly useful from the start. Among these are several forage plants, and the mold, *Penicillium chrysogenum* (then known as *P. notatum),* which Alexander Fleming first began working with in 1928 and helped domesticate over the next decade. Almost from the beginning penicillin saved lives. But these exceptions prove the rule: the overwhelming majority of domestications in the last 500 years have had little or nothing to do with satisfying basic needs.

How did almost our entire species become dependent on domesticated organisms, which appear to have arisen in a spirit blending compassion, aesthetic curiosity, belief in magic, and desire for luxuries? According to David Rindos, population growth has probably had more to do with determining the contours of domestication than any other single factor.[8] As population grows, the easiest response is usually to produce

more food per unit of land. This favors agriculture, ever more intensive. Population growth also favors using and selecting domesticated creatures for food, irrespective of how they became associated with us in the first place, and irrespective of long-term social and environmental consequences.

Aesthetic appeal seems to have played a role in domestication, but the rise of pure ornamentals, that is plants cultivated only for their aesthetic qualities, is a much later development. And the use of live organisms in art comes later still.

The first major exhibition of living things as art did not occur until 1936, when *Edward Steichen's Delphiniums*, an installation of cut delphiniums, was held at the Museum of Modern Art. Steichen had bred the plants at his farm in West Redding, Connecticut, where he also hybridized cleomes, sunflowers, and poppies. The show was widely and enthusiastically reported in the press. Steichen believed that the event confirmed plant breeding as a fine art. [9]

As art materials, organisms can be divided into two broad categories: sentient and non-sentient. To the best of our knowledge, sentience or the capacity for feeling or consciousness, occurs only in creatures with nervous systems: animals. To ignore the suffering of animals, or to explain it away, as Descartes attempted to do when he described the cries of animals as grinding gears, is not an option for artists today. No one knows exactly what any other creature experiences, but we have compelling reason to believe that virtually all vertebrates feel pleasure and pain. As for invertebrates, there is no consensus about exactly where sentience begins or is of sufficient order to raise the kinds of ethical questions that apply to vertebrates. Octopuses, for example, respond to the world in ways that may be as complex as fishes or birds.

Plants cannot suffer, and therefore can be manipulated in ways that would be unethical with animals. With plants few experiments are automatically off-limits except those that might do damage to the environment, or cause sentient creatures unnecessary pain. Somewhat like paint and clay, plants, along with bacteria, fungi, and tissues grown in vitro, permit artists to make mistakes, including ones fatal to the organism. Plants may even allow the artist to be cavalier or perverse, which we must sometimes be as we explore the role of human consciousness in evolution. Of course, to kill a plant is to eliminate a living being with a unique set of possibilities. To kill a plant involves assuming responsibility. As Donna Haraway puts it in a slightly different context, "this is … the beginning of serious accountability inside worldly complexities." Killing plants is permissible, but casual, willfully unaware killing is not. [10]

A distinguishing feature of bio art is that because its materials are alive, they are our kin. To recognize another as kin is to see oneself in the other. Our kinship with vertebrates is obvious because their bodies are organized much like our own. Their tempos resemble ours, and most of us sense something of their capacity for pleasure, pain, and responsiveness. But how are we to recognize ourselves in plants? Although we have affinities on the subcellular level, in the context of art, to define kinship in terms of proteins and base pairs is only of limited use.

Plants have no nervous systems and to the best of our knowledge interact with the world entirely without consciousness. This does not make them absolutely different from us - far from it. We contain within ourselves something of their way of being. What we share, I believe, is not any particular experience of life, but something fully as important: non-experience of life.

The extent to which we do not and cannot experience life is something that I began to appreciate only after the first time I had surgery. I was twenty-two. Skateboarding down a hill in San Francisco, I fell and fractured my ankle. At a hospital, sodium thiopental eliminated not only every trace of pain, but dreams and perception of time. The instant that I went under the drug, I awoke - six hours later. In that interlude existence ceased, yet I continued to breathe and metabolize, my blood circulated. A surgeon drilled through my bones, adding wires and screws to my ankle, without causing me the least discomfort.

The non-experience of total anesthesia was how I first learned for myself that life is not synonymous with consciousness. What is the experience of a pancreas? A mitochondrium? Most of us are quite happy never to know. Our lives drift on a sea of eternal unconsciousness far deeper than anything that Freud or the surrealists charted. Not even the most shadowy intuitions materialize in the depths of that ocean. It is a realm permanently without awareness, and yet it is here that the intricate structures and processes which comprise the support system of consciousness generate.

When we ignore the realms beyond consciousness, we ignore our connections to the larger community of living beings, most of which, over immense spans of time, have lived and died without once awakening. Plants are reminders of the structures that sustain consciousness. Plants are reminders of our forgotten selves.

Excerpted from *Green Light: Toward an Art of Evolution,* by George Gessert. Published by The MIT Press, http://mitpress.mit.edu/.

References and Notes, Divine Plants and Magical Animals.

References

1. For a review of studies of the origins of domesticated plants, see David Rindos, The Origins of Agriculture. (Orlando: Academic Press, 1984) 82-143

2. Sauer, Carl, Seeds, Spades, Hearths, and Herds. (Cambridge, Mass.: MIT Press, 1969) 20-21

3. Carl Sauer in ibid. 30

4. Carl Sauer in ibid. 27

5. Carl Sauer in ibid. 32, 35, and 60

6. Domesticated strawberries arose from three species. Garden strawberries were bred in Europe from two nonEuropean species, Fragaria chileonsis from Chile, and F. virginiana from Eastern North America. The alpine strawberry, F. vesca, is European, and has been cultivated since ancient times. Domesticated strains have existed since the 18th century.

7. The pattern can be different with highly domesticated plants that move from one culture to another.

8. David Rindos, The Origins of Agriculture. 258-271

9. Ronald J. Gedrim, "Edward Steichen's 1936 Exhibition of Delphinium Blooms" in History of Photography, Winter 1993. Vol. 17, No. 4. 354 – 360

10. Donna Haraway, When Species Meet. (Minneapolis, Minn.: University of Minnesota Press, 2008) 108

George Gessert is an artist and writer. He has exhibited widely in the United States, Canada, Europe, and Australia. In 2005 he was awarded a Pushcart Prize, and in 2007 was included in Best American Essays. This Year MIT Press published Green Light: Toward an Art of Evolution.

The text reproduced in this issue of Antennae is an extract from Green Light, published by the MIT Press and reprinted here with permission of author and publisher.

THE SILENCE OF THE PLANTS

In Autumn Antennae launched an experiment called The Silence of the Plants. *Triggered by the publication of a newspaper article on the subject of plants and ethics published on The New York Times, a challenging and colourful discussion amongst some of Antennae's readers, contributors and board members emerged. The article titled 'Sorry vegans, Brussels sprouts like to live too' is an intentional provocative and challenging piece that pushes a number of relevant buttons from vegetarianism/veganism to sentient/non-sentient qualities in plants and animals and broader questions about animal and plant life.*
The original article and exchange is featured here.

December 22, 2009
Sorry, Vegans: Brussels Sprouts Like to Live, Too
By Natalie Angier

I stopped eating pork about eight years ago, after a scientist happened to mention that the animal whose teeth most closely resemble our own is the pig. Unable to shake the image of a perky little pig flashing me a brilliant George Clooney smile, I decided it was easier to forgo the Christmas ham. A couple of years later, I gave up on all mammalian meat, period. I still eat fish and poultry, however and pour eggnog in my coffee. My dietary decisions are arbitrary and inconsistent, and when friends ask why I'm willing to try the duck but not the lamb, I don't have a good answer. Food choices are often like that: difficult to articulate yet strongly held.

And lately, debates over food choices have flared with particular vehemence. In his new book, "Eating Animals," the novelist Jonathan Safran Foer describes his gradual transformation from omnivorous, oblivious slacker who "waffled among any number of diets" to "committed vegetarian."

Last month, Gary Steiner, a philosopher at Bucknell University, argued on the Op-Ed page of The New York Times that people should strive to be "strict ethicalvegans" like himself, avoiding all products derived from animals, including wool and silk. Killing animals for human food and finery is nothing less than "outright murder," he said, Isaac Bashevis Singer's "eternal Treblinka."

But before we cede the entire moral penthouse to "committed vegetarians" and "strong ethical vegans," we might consider that plants no more aspire to being stir-fried in a wok than a hog aspires to being peppercorn-studded in my Christmas clay pot. This is not meant as a trite argument or a chuckled aside. Plants are lively and seek to keep it that way. The more that scientists learn about the complexity of plants — their keen sensitivity to the environment, the speed with which they react to changes in the environment, and the extraordinary number of tricks that plants will rally to fight off attackers and solicit help from afar — the more impressed researchers become, and the less easily we can dismiss plants as so much fiberfill backdrop, passive sunlight collectors on which deer, antelope and vegans can conveniently graze. It's time for a green revolution, a reseeding of our

stubborn animal minds.

When plant biologists speak of their subjects, they use active verbs and vivid images. Plants "forage" for resources like light and soil nutrients and "anticipate" rough spots and opportunities. By analyzing the ratio of red light and far red light falling on their leaves, for example, they can sense the presence of other chlorophyllated competitors nearby and try to grow the other way. Their roots ride the underground "rhizosphere" and engage in cross-cultural and microbial trade.

"Plants are not static or silly," said Monika Hilker of the Institute of Biology at the Free University of Berlin. "They respond to tactile cues, they recognize different wavelengths of light, they listen to chemical signals, they can even talk" through chemical signals. Touch, sight, hearing, speech. "These are sensory modalities and abilities we normally think of as only being in animals," Dr. Hilker said.

Plants can't run away from a threat but they can stand their ground. "They are very good at avoiding getting eaten," said Linda Walling of the University of California, Riverside. "It's an unusual situation where insects can overcome those defenses." At the smallest nip to its leaves, specialized cells on the plant's surface release chemicals to irritate the predator or sticky goo to entrap it. Genes in the plant's DNA are activated to wage systemwide chemical warfare, the plant's version of an immune response. We need terpenes, alkaloids, phenolics — let's move.

"I'm amazed at how fast some of these things happen," said Consuelo M. De Moraes of Pennsylvania State University. Dr. De Moraes and her colleagues did labeling experiments to clock a plant's systemic response time and found that, in less than 20 minutes from the moment the caterpillar had begun feeding on its leaves, the plant had plucked carbon from the air and forged defensive compounds from scratch.

Just because we humans can't hear them doesn't mean plants don't howl. Some of the compounds that plants generate in response to insect mastication — their feedback, you might say — are volatile chemicals that serve as cries for help. Such airborne alarm calls have been shown to attract both large predatory insects like dragon flies, which delight in caterpillar meat, and tiny parasitic insects, which can infect a caterpillar and destroy it from within.

Enemies of the plant's enemies are not the only ones to tune into the emergency broadcast. "Some of these cues, some of these volatiles that are released when a focal plant is damaged," said Richard Karban of the University of California, Davis, "cause other plants of the same species, or even of another species, to likewise become more resistant to herbivores."

Yes, it's best to nip trouble in the bud. Dr. Hilker and her colleagues, as well as other research teams, have found that certain plants can sense when insect eggs have been deposited on their leaves and will act immediately to rid themselves of the incubating menace. They may sprout carpets of tumorlike neoplasms to knock the eggs off, or secrete ovicides to kill them, or sound the S O S. Reporting in The Proceedings of the National Academy of Sciences, Dr. Hilker and her coworkers determined that when a female cabbage butterfly lays her eggs on a brussels sprout plant and attaches her treasures to the leaves with tiny dabs of glue, the vigilant vegetable detects the presence of a simple additive in the glue, benzyl cyanide. Cued by the additive, the plant swiftly alters the chemistry of its leaf surface to beckon female parasitic wasps. Spying the anchored bounty, the female wasps in turn inject their eggs inside, the gestating wasps feed on the gestating butterflies, and the plant's problem is solved.

Here's the lurid Edgar Allan Poetry of it: that benzyl cyanide tip-off had been donated to the female butterfly by the male during mating. "It's an anti-aphrodisiac pheromone, so that the female wouldn't mate anymore," Dr. Hilker said. "The male is trying to ensure his paternity, but he ends up endangering his own offspring."

Plants eavesdrop on one another benignly and malignly. As they described in Science and other journals, Dr. De Moraes and her colleagues have discovered that seedlings of the dodder plant, a parasitic weed related to morning glory, can detect volatile chemicals released by potential host plants like the tomato. The young dodder then grows inexorably toward the host, until it can encircle the victim's stem and begin sucking the life phloem right out of it. The parasite can even distinguish between the scents of healthier and weaker tomato plants and then head for the hale one.

"Even if you have quite a bit of knowledge about plants," Dr. De Moraes said, "it's still surprising to see how sophisticated they can be."
It's a small daily tragedy that we animals must kill to stay alive. Plants are the ethical autotrophs here, the ones that wrest their meals from the sun. Don't expect them to boast: they're too busy fighting to survive.

This article was originally published in *The New York Times* on the 22nd of November 2009 and is here reprinted with permission of the publishers.

Rachel Swinkin said...

"Sorry Non-Cannibals: But Cows Like to Live, Too." This wouldn't work as an argument for eating people any more than the title of Angier's essay works as an argument for eating meat. There are positive reasons for not eating cows or chickens that are not negated by recognizing that various plants possess powerful defenses, sensitivity to their environment, and perhaps even forms of intelligence. I am oversimplifying by suggesting the article is meant as a straightforward attack on vegans, even though the title frames it that way. The essay itself does not really offer an argument against veganism but seems to claim only that ethical decisions about what, and what not, to eat are not as clear-cut as (some) vegans/vegetarians believe. But anyone who has been a vegetarian (I'll use the broader term to include both vegans and vegetarians) for any length of time has been confronted by a similar challenge to her dietary choices: "Carrots may have feelings, too, and you eat carrots, so get off your high horse and eat meat like the rest of us (but not your horse of course, because horses are nice!)". It is not a very strong argument and is usually countered by pointing out the obvious differences between the intelligence and sentience of the animals and plants we eat, often on the basis of anatomy (plants may sense light or detect the presence of certain chemicals, but do they feel pain? do they suffer for it?). One could also point out to Angier that the fact that all organisms have survival mechanisms (a basic component of evolutionary theory) doesn't necessarily imply any kind of intention or desire on the part of individual plants (as one commenter on the Times site points out, plants often survive by allowing themselves to be eaten). Or we might point out to Angier that "like" (in the phrase "Brussels sprouts like to live") may mean something entirely different when applied to a Brussels sprout than it does when applied to a mammal or bird. Saying a plant likes or wants to live, in other words, may involve what we normally call anthropomorphism--but perhaps zoomorphism would be more precise in this case.

The differences between a pig and a carrot in terms of sentience, intelligence, and awareness are huge and are probably sufficient to counter an attack on vegetarianism that was not made in good faith in the first place (the self-styled carrotist doesn't really care about lessening the suffering of carrots; she just wants to absolve herself of the guilt of eating meat). Yet in defending the line between plant and animal, the vegetarian finds herself in a position similar to those who try to maintain a strict line between human and animal. Both are policing boundaries, and while I realize that humans actually are a kind of animal while animals are not a kind of plant, I have to ask, is policing boundaries the best way to argue for more compassion in the world? Angier is arguing that plants can sometimes be human- or animal-like. But what if we turn this around: is it possible that allowing that animals, including humans, may be plant-like in various ways might actually advance attempts to interact with the world in a more ethical and compassionate way, including (but not limited to) vegetarianism? (I have some thoughts on this, but I'll let others chime in first.)
26 October 2010 11:25

Ron Broglio said...

Implicit in the article is the idea that eating is a violence that is unavoidable. Rachel Swinkin (Hi, Rachel) makes a strong point regarding leveling all eating as equal. The article makes eating plants more complex but only then to equate this complexity with that of eating animals. What the article does help us do is think about all eating engaging with the question of "eating well." How is our eating staged and managed? and by whom?
31 October 2010 08:33

MAI said...

We all have to eat, animals including humans AND plants, it is that we do it differently, and that is all. More to the point ... when you as a vegan are walking along a garden path and pull a leaf off a tree for no reason, are you really engaged with nature, being totally in tune with your inner senses and place within the greater whole, or are being like any meat-eater? We, as humans, need at least plant life to live, that is a biological reality, but are we being compassionate and respectful of life at all times?
5 November 2010 19:43

cg said...

Rachel Swinkin eloquently makes an argument with which I agree. As a vegetarian/vegan for the last 30 years I have heard the "what about plants?" argument against my ethical choice more times than I care to count. Many of these times were long before people began to consider the agency of plants. As someone who senses the sentience of trees, I also feel the sensitivity of plants to the world around them is not a valid argument FOR eating animals, but a wake up call to a continuum of living beings of which we are part, and a small one at that. 6 November 2010 13:01

Susan said...

I have a friend who believes that sentience is not a good dividing line between OK-to-eat and not-OK-to-eat, partially b/c he believes plants are sentient. He writes, "Veganism without environmental concerns and behaviour appropriate to respecting global ecosystems is absurd." I have to agree (although perhaps absurd is a bit strong). I've listed some sources of the sort of material contained in the article, which I believe would be helpful in formulating a compelling stance,
here: http://animalrightscommunity.com/abolitionists/green-murder-t528.html?hilit=plants#p2722
7 November 2010 12:55

Giovanni Aloi said...

I am very pleased to see that the subject of plants has triggered such an interesting debate. There are however a few things I would like to point out in order to perhaps push this discussion towards a more productive direction. Firstly, I'd like to point out that Angier's is not technically an essay, but a newspaper article and that failing to recognize the peculiarities of such genre does unavoidably lead to misinterpretations. As far as I am concerned the article is not arguing anything, at least not in academic terms. A newspaper article's main purpose is information and at that this piece delivers an amount of new and exciting info about plants. This information is something that almost everyone who has thus far commented on the thread seems to have belittled or either deliberately ignored. Yes, Angier's piece starts from "eating" but it is clear that this premise is a trick, a humorous one, to engage the reader. It does not constitute the premise to a solid argument. Likewise its title is a call for attention, more than anything else. It is interesting that vegetarians/vegans feel this is an attack on vegetarianism, when I personally only understand this article as a welcome opportunity to make the general public think about plants in a different light. How else would engage a wide audience on such topic? Moreover so, the piece never does invite readers to give up vegeterianism in the light of plant's newly discovered agencies. In a discounted diaristic style, it only aims to invite the reader to think of their own everyday reality. Carol may be right in saying that the argument that plants suffer too has been around for 30 years, but the newly gathered information on plants we are offered by the text is not. What about that? Do we decide that it is worth looking into this newly discovered evidence or do we think we are somehow above it and that plants do not deserve such attention? I would only like to remind everyone that many academics involved in the study of classical subject frown upon us human-animal studies people for devoting so much focus on animals. Are we witnessing similar dynamics in the animal-studies community towards those interested in micro-fauna? Whether an animal or plant is sentient or not is simply not the point. We will never know how certain things feel to these "others" and comparing pain should no longer be seen as the main indicator of "being sentient" for "being sentient" is a much more complex and subtle matter. Isn't the idea of exploring new kinds of "being sentient" exciting? Well, if we are truly interested in exploring these different ways, plants are offering a way forward as much as insects, amphibians and other cold-blooded animals do. It is by trying to move as far as possible away from anthropomorphic approaches that we may create new and challenging knowledge about other beings. Considering that posthumanism has worked so hard at questioning boundaries why would one so keenly want to preserve the one dividing animals and plants? What productive opportunities are there in maintaining such clear division if not the creation of fictitious certainties and comfort. In my opinion thinking in a "contemporary way" is an uncomfortable task, one that aims at making the world in which we live in less comfortable. Secular divisions only make the world a comfortable, simplified and predictable place.
20 November 2010 05:09

Carol Gigliotti said...

What does one do with all this new information, then? Do we merely file it as interesting and exciting and continue to eat up our salad? My goal is not to preserve the border that has been erected between animals and plants, but to continue to make transparent the consequences of borders between all species, while respecting differences. I am not so interested in "moving as far away as possible from anthropomorphic approaches", though I am not so interested in "moving as far away as possible from anthropomorphic approaches", though I am interested in moving away from anthropocentric approaches. As a number of cognitive ethologists, such as Marc Bekoff and G. A. Bradshaw, tell us "Anthropomorphism is a much more complex phenomenon than we would have expected. It may very well be that the seemingly natural human urge to impart emotions onto animals - far from obscuring the "true" nature of animals - may

actually reflect a very accurate way of knowing. And, the knowledge that is gained, supported by much solid scientific research, is essential for making ethical decisions on behalf of animals" (Bekoff,M. *The Emotional Life of Animals*). As well, those ways of knowing are linked to both imagination and empathy, something that making art teaches us, as well as the relatively recent cognitive research of Lakoff and Johnson (Philosophy of the Flesh). Both imagination and empathy play huge roles in creative thinking as well as in making ethical decisions. And "anthropomorphism," used well, allows us to "sense" both similarities and differences. I think this works, if one is open to it, in sensing other ways of being across and within species. I do not think that the ethical issues around the lives of animals and the lives of plants are separate, but I do think that what we do with all this new knowledge is crucial for the lives of the beings involved and the life of the planet as a whole.
20 November 2010 15:53

Joe Zammit-Lucia said...

The information being presented in the article is interesting in terms of what science is putting forward as its current set of propositions. But, to me, what is more interesting is, of course, the implications of that in terms of our own behaviours. It seems to me that the issue that is being addressed - are plants sentient and so what - is only interesting because of the movement that has existed to put forward sentience, ability to suffer pain, existence of emotion etc as the underpinning of 'animal rights'. Personally, I have never been attracted by that line of thought. To my mind it is anthropocentric in that is uses 'similarity to us' as the reason for treating animals well. This thinking is deeply embedded as evidenced by the very first sentence in Angier's article and the general thrust of the whole article. My preference is for a philosophy that treats everything around us with respect - whether sentient or not; whether similar to us or not; etc. A rock deserves as much respect as a chimpanzee. This is far from a new philosophy of course. It has been part of Eastern philosophies for centuries but it has never had any traction in the West. Why? I'll come to that later. But, if one accepts the philosophy of broad respect, and also accepts the fact that we have to eat something, then 'ethical' food choices should depend on whether that food has been raised and treated with due respect not whether it is plant or animal, sentient or not, biologically sophisticated or not. Under this philosophy, this new information that is being put forward is irrelevant to one's food choices. However, this is not how we seem to behave. The idea of sentience as driving ethical choices is embedded. Further, some seem to believe that only sentience as defined through the methods of traditional western science matters. So, although we have had many writings in different disciplines in the past about plants, their importance to humans in many ways, how people believe they are sentient, etc, our western culture largely ignores that. Only when science partially catches up and starts coming up with 'evidence' of sentience are we supposed to get excited and start re-considering our ethical choices. This post-Enlightenment primacy of Science in our western culture causes us to dis-respect things about which we are scientifically ignorant. Only when Science has something to say do we listen. And this is one reason why the eastern philosophies of broad respect - a concept that is mystical and philosophical rather than scientific - never gets traction in the west. In response to Giovanni's question as to whether this new information is interesting and worth pursuing, my view is that it is. New knowledge expressed within the scientific paradigm is, to me, always interesting and may eventually be found to be practically useful. So I find the new information interesting in providing one more perspective on life on Earth. But it makes no difference whatsoever to my own world view or my own definition of ethical choices. Neither do I give this information any special primacy because it is phrased in the language of science rather than other languages we speak.
20 November 2010 17:21

Lucy said...

I'm not responding to the article directly. But living in Southeast Asia with an interest in trees and in wood, it occurs to me how not all plants are equal. Some trees for example are experienced as familiars-- perhaps because they stand tall and vertical (like us) and ascribed a sentience/wisdom that is greater than other plants. This is the case both in historic or vernacular tree lore, evidenced in beliefs in various kinds of tree spirits throughout the archipelago, and also in the representational iconography of ecological activism: There are regular comments and images in mass media and online postings about logging and deforestation, which evoke the slaughter of animals: The "wounds" created by the chainsaw; Logs and sawn planks are depicted stacked up like corpses and so forth. Perhaps indeed this anthro/zoopomorphism is leading us somewhere-- to a "way of knowing" trees. But there appear to

be representational differentiations, hierarchies between more and less familiar, more or less charismatic plants. And then there are of course differences between wild plants and trees, the rainforest and plantation plants. Palm oil is evil invasive, destructive. Rubber regimented. Teak is interesting as teak was the palm oil of the 16 and 17 century, responsible for the destruction of large areas of Indonesian rainforest when introduced as plantation timber crop from Burma and India. But now teak trees are venerated in their own right, ascribed konservasi conservation status.
20 November 2010 19:00

Giovanni Aloi said...

I find myself in strong agreement with Joe Zammit-Lucia's perspectives on the relevance of the new evidence concerning plants, and also embrace the view that our dependency on scientific knowledge leads us to dis-respect beings about which we are scientifically ignorant. From this perspective I do not necessarily believe that understanding or valuing something may not involve eating that something. The opposite is indeed true. Culinary knowledge is also a form of "knowledge of nature" and to some of us it is the only direct form of knowledge concerning the living that one may desire. I do not necessarily believe that eating something is a form of disrespect for something. Native Americans (and other cultures) thanked the food they ate and respected the animals they killed for they indeed appreciated the values of the lives which were lost in order to provide nourishment. One can indeed eat and value in recognition that life, on this planet, relies on the eating of something for its substantiation, whether animal or vegetable. Hunting, as artists Bryndis Bjornsdottir and Mark Wilson have demonstrated through their artworks is also a form knowledge creation which however ends in the killing of the animal itself. As previously said, I have never read the article as an invitation to eat animals instead of plants and believe the author never makes a case for this. I think the article interestingly brings us to think on what grounds one may decide what to eat. Erica Fudge and Tom Tyler also have carefully evaluated the pros and cons of anthropomorphism and I am very aware that both have mainly thought it through the animals with which we have been forging relationships for millennia. Pets and farm animals belong to a different category altogether, in my opinion. Our closeness with them has influenced our relational modes in such way that there may be no way to effectively mark the boundaries of anthropomorphic and non-anthropomorphic traits. When it comes to cats and dogs, one may argue that the entire relationship is shaped by anthropomorphism and that pet owners are not interested in other kinds of knowledge for the cat and the dog are no longer non-human animals but something else altogether. Here anthropomorphism may be a productive avenue for the animal involved has entered a sort of becoming-human anyway. However, when it comes to cold-blooded animals and even plants, then the lens of anthropomorphism can be indeed counterproductive, limiting and distortive. I indeed do not believe that anthropomorphism "may actually reflect a very accurate way of knowing" because accuracy simply cannot be the quality of anthropomorphism in that anthropomorphism is too much reliant on subjectivity. This is the very problem of anthropomorphism. At a stretch, from a structuralist perspective, I think anthropomorphism could be equated to culinary knowledge, where the knowledge of the animal is indeed a form of "knowing" but it is largely relying on personal and cultural taste.
21 November 2010 07:31

Boria said...

This is why I find utilitarianism becomes almost completely meaningless if we try to practice it on a massive scale. I have enough trouble figuring out what my own interests are, and am probably wrong about that more than half the time. How can I hope to identify, much less balance, the interests of wolves, frogs, chickens, beetles, trees, and so on? It's crazy!
21 November 2010 09:50

Boria said...

If we say that "anthropomorphism" consists of imputing human traits to animals or plants, we raise the question of, "What are 'human' traits?" There are as many kinds of anthropomorphism as there are people. Another way to think of anthropomorphism is as a merging of identity with other beings. As we contemplate, touch, speak to, or eat, other forms of life, we seem to merge with them, both as individuals and as representatives of humankind.
21 November 2010 10:02

Joe Zammit-Lucia said...

I agree wholeheartedly with Giovanni that eating something is not necessarily a form of disrespect -

that line of thinking would not lead us anywhere productive. Hunting for food is, in my opinion, much more desirable than, say, battery farming. None of us would suggest, for instance that the lion is disprespectful of the zebra he has just killedfor food. Or the giraffe disrespectful of the trees she is munching on, or the Venus fly-trap disrespectful of the fly. But I think the discussion about anthropomorphism is worthy of further discussion. "However, when it comes to cold-blooded animals and even plants, then the lens of anthropomorphism can be indeed counterproductive, limiting and distortive." I am interested in understanding this viewpoint further ie the dividing line between when anthropomorphism is useful vs not and why there should be that line. I am drawn to Boria's idea of 'merging' and would love to hear more as to where that has been explored. I also find myself drawn to Carol's perspective: "I am not so interested in "moving as far away as possible from anthropomorphic approaches", though I am interested in moving away from anthropocentric approaches." One way of looking at this is that anthropomorphism is simply one approach to help us empathize and maybe 'understand' those that are unlike us (Boria's merging being one form of expression of this). I know many will disagree with the use of 'understand' in this context, but, not to labour the point, I believe that that is because our cultural concept of understanding has become almost totally hijacked by science. Science has become primary in what we define as 'knowledge' or 'understanding' and the natural sciences have rejected anthropomorphism as a form of understanding, replacing it by their own paradigms and arbitrary structures that represent 'the truth' - or so the Nietzschean power structure of science would have us believe. Like Carol, I am more bothered by anthropocentrism than anthropomorphism. The former puts humans at the centre of the universe and subordinates all else. This I believe to be harmful. I do not see anthropomorphism as harmful but merely a way of seeing that is somewhat inevitable since as we are all human. Giovanni, I am not sure I fully understand the view which you expressed on anthropomorphism. If one contends that anthropomorphism is 'distortive' what lens are we offering in its place that is non-distortive and therefore represents 'truth' or 'reality'? If anthropomorphism is 'subjective', what are we putting forward in its stead that is 'objective' and, presumably therefore 'true'? Personally, I take a post-structuralist view of all this and have difficulty buying into the idea of an objective truth. I believe that what we can usefully strive for is to develop different ways of seeing or 'understanding' without believing that one of those ways represents the truth and the others do not. Anthropomorphism is one such way.
21 November 2010 13:54

Adam Dodd said...

It is my understanding that the animal/plant binary that continues to frame many conceptions of life on Earth has been shown by microbiologists, for some time now, to be erroneous. All life on Earth is known to be composed of either nucleated cells (making them eukaryotes) or non-nucleated cells (making them prokaryotes). The first group includes plants, fungi, and animals - three broad groups with fuzzy borders owing to their shared cellular heritage. The second group includes bacteria. Considered on a cellular level, eating a plant is not so different from eating an animal, since it is ultimately a case of one eukaryote consuming another eukaryote. Of course, the question of how much of our daily experience of life we wish to consider in terms of its cellular basis remains very much open to question. More to the point, debates about the sentience of animals, plants and fungi seem consistently problematised by the requirement to "rethink" what is meant by fundamental terms such as "sentience," primarily because of the incessant wariness of fallacies and mistakes attributable to anthropocentrism and anthropomorphism. However, if we consider ourselves Darwinists, then it should be relatively unproblematic to apprehend the likelihood that a range of continuities (morphological and mental) extends throughout all eukaryotic life forms. I'm not saying we're there yet, but to me, it seems this is the only possible outcome of our current philsophical and biological paradigm.
22 November 2010 05:40

Giovanni Aloi said...

Following on from Joe's entry, I just wanted to explain further my perspective on anthropomorphism. In identifying anthropomorphism as limiting and distorting I do not wish to automatically claim that there is an objective or "true" alternative approach that could be used instead. Of course, ultimately everything is seen through us and therefore is in one way or the other partial/distorted. One can argue that truth does not exist. My argument revolves around differentiation in approaches in the consideration of bio-diversity and the challenges that bio-diversity poses. As I mentioned, anthropomorphism may work in productive ways with mammals and especially with pets and farm

animals. And this is largely due to the fact that a human-animal becoming has characterized such relationships. The same cannot be said for relationships between humans and snakes or frogs for instance. There is a need to define different approaches for the relational involved with these animals - "those who do not return the gaze". Turning to eastern cultures and philosophical approaches has become more and more a feature in the questioning of our western ways based on the logocentric emphasis on culture which thus far has prevented a consistent shift from an 'I-centerdness' humanist position. The work of Kinji Imanishi, a Japanese ecologist and anthropologist, founder of Kyoto University's Primate Research Institute suggested a different relational model with nature as early as in 1941. In his book, A Japanese View of Nature, Imanishi re-thinks our understanding of animals, environment and humans by outlining a holistic cosmos where animals are integral part of environmental systems and environments are seen as extensions of living things. The work of Imanishi is of particular interest as it operates across the fields of biology and philosophy, whilst pioneering views that today have come to the fore of ecological concerns. In the chapter Similarity and Difference of the book, Imanishi explains that: "The category of living things includes both, animals and plants, advanced and primitive things, and many in between; each inhabits its own world and leads a particular life so that each living thing should be studied in its own proper perspective". Which new methodological approach to use is for us to find out and develop. What I am suggesting is not that there may be a "truer" counterpart to anthropomorphism, but that we can develop, in conjunction with scientific knowledge (something anthropomorphism does not do) something alternative that may bridge the wide abyss between us and cold blooded animals and plants. Jakob von Uexküll offered an interesting opportunity for a change in attitudes towards animals in general and moreover so towards those taxonomically distant beings as he formulated the concept of Umwelt whilst studying ticks at the beginning of 1900. His interest in the infinite variety of perceptual worlds of imperscrutable animals drove him to develop the concept in order to avoid being trapped in the false knowledge imposed by human judgment, anthropomorphism and the superimposition of human values. Agamben describes Umvelt as follows: "Where classical science saw a single world that comprised within it all living species hierarchically ordered from the most elementary forms up to the higher organisms, von Uexkull instead supposes an infinite variety of perceptual worlds that, though they are uncommunicating and reciprocally exclusive, are all equally perfect and linked together as if in a gigantic musical score". Would there be an opportunity to expand or adapt this concept to different species and even plants?
23 November 2010 09:58

Adam Dodd said...

Here's a link to a recent BBC report on ability of plants to "remember." Apart from the reported findings, it's interesting to note the use of hesitant scare quotes throughout the article.
http://www.bbc.co.uk/news/10598926
24 November 2010 02:45

Matthew Pianalto said...

I strongly agree with the remarks by Joel Zammit-Lucia about sentience. Drawing a moral line at sentience, with the implication that non-sentient beings warrant no direct moral consideration, is an unsatisfactory moral theory. Adam Dodd's point about continuity is also well put. Once one accepts the idea that non-sentient beings (as well as ecological systems, and so on) warrant moral consideration in their own right—-which is to say that it is small-minded to view such things as "mere" resources—-one can see that even if Angier's description of plants is "merely" anthropomorphic, this wouldn't justify dismissing plants from moral attention and concern. I agree that the title of Angier's piece ultimately distracts from the value of her work, insofar as an account of the biological complexity of plants is the sort of writing that can open up a person to seeing plants anew (see below). She reveals in her article that plants can be seen as exhibiting what Albert Schweitzer described as the "will to live" manifest in all living beings--something to which he insisted we should cultivate an attitude of reverence. As for Angier's reservations about "[cedeing] the entire moral penthouse to 'committed vegetarians' and 'strong ethical vegans,'" I think the point to make here is one that Thoreau made, which is that no dietary habit or restriction, in itself, makes one virtuous, because virtue in consumption depends not only upon what one eats, but also *how* one eats—and even a vegetarian or vegan could consume without respect for one's food, or oneself (e.g. in a spirit of indifference on the one hand or gluttony on the other). Thoreau: "A puritan may go to his brown-bread crust with as gross an appetite as ever an alderman to his turtle. Not that food which

entereth into the mouth defileth a man, but the appetite with which it is eaten" (*Walden*, "Higher Laws"). One could thus extend the critique of those who attempt to justify eating animals on the ground that "they're just animals" to the case of plants by pointing out that the claim, "they're justplants," is equally dismissive. This doesn't mean one should resist eating plants (or, some would argue, animals either), but rather that one cannot eat respectfully if one's rationalizations rest on the logic of dismissal: "it's just an X." Such an attitude is incompatible not only with respect, but also with training one's eye toward the amazing intricacy of even the most ordinary things. In my view, cultivating that sensibility is an essential part of moral and spiritual development. Matthew Pianalto Department of Philosophy & Religion Eastern Kentucky University
24 November 2010 09:00

Joe Zammit-Lucia said...

Giovanni, I take your points. I guess we can agree to disagree about anthropomorphism. Maybe an Antennae issue devoted to the subject could be interesting? As regards "the false knowledge imposed by human judgment", is science not precisely that? I guess reading these posts, I am led to reflect on why, individually, we are interested in these things. My own interest is not philosophical or academic but practical. I am interested in how we can create a solid, sustainable and 'sellable' underpinning for an improved human relationship with 'nature' and 'the environment' (we won't get into trying to define those!). It is from this perspective that I see prejudice against anthropomorphism as counter-productive besides, in my opinion, being poorly grounded. As to the issue of 'returning the gaze', here are two quotes. The first is from Sir David Attenborough - a scientist no less: "there is more meaning and mutual understanding in exchanging a glance with a gorilla than any other animal I know….We see the world the same way they do." I find this statement self delusional in the extreme. On the other hand I find myself in sympathy with Berger's view: "The animal scrutinizes [Man] across a narrow abyss of non-comprehension… The man too is looking across a similar, but not identical, abyss of non-comprehension…He is always looking across ignorance and fear." I believe this applies equally to a gorilla and a lizard or a fish that one exchanges long gazes with when scuba diving. I am also intrigued by Matthew's comment that "an account of the biological complexity of plants is the sort of writing that can open up a person to seeing plants anew". This is one of the valuable things that scientific description (I am trying to avoid the word 'knowledge') can do - as in Angier's article. But ultimately, it's not the scientific description that matters but our ability to open our minds to seeing things anew and, eventually, to grant them respect. If science be the trigger for that, all well and good. Any other trigger welcome.
30 November 2010 08:45

Matthew Pianalto said...

"Any other trigger welcome." Joe: Yes, I agree. (And perhaps it should be added that "seeing anew" here is connected to something like renewing one's ability to see things with a sense of wonder.)
30 November 2010 09:07

Adam Dodd said...

Just as a follow up to Joe's Attenborough quote. I have been interested in Attenborough's anthropomorphism for a number of years now. He seems to maintain a deeply unstable position on the matter. Apart from his comments about gorillas, he has also said this about spiders (in 2005): "I think the thing that surprises you is that when you watch invertebrates normally, say spiders, you think, 'well, they're just spiders and mechanical little creatures,' but when you start to film them, you discover they have individual personalities...I mean, you can watch spiders of the same species, and some are lazy, some are hard working, some don't like light. They all have personalities, there's no doubt about it." Here we have a great example of how turning one's close attention to a nonhuman animal results in the emergent apprehension of nonhuman personality - even in an animal as "mechanical" as a spider.
1 December 2010 04:01

Giovanni Aloi said...

Yes an Antennae issue on the subject should certainly arise in the near future. About your point on my sentence: "the false knowledge imposed by human judgment", is science not precisely that?" I would argue that the main differences between anthropomorphic approaches and scientific approaches lay in that the latter relies on methodologies that are tested and recognized or agreed upon (or dismissed) by a inter-communicating community. Anthropomorphism doesn't follow a methodological approach that can be tried and tested. As such I would not

confuse the kinds of "falsity" they produce, for they are very different indeed. I am also very interested in Adam's quote of Attenborough for it poses an interesting question: that of the personality within the species. How are we to understand such differences between animals of a same species, is indeed a challenge. Although the use of the work "mechanical" is greatly problematic here, there is something underneath the surface for sure. Nobody would deny that cats and dogs have personality beyond their species identity and I would assume that the same could indeed be said for spiders or other insects. However, how are we to measure, judge, understand these differences is a challenge. But it is, as a starting point important to not deny these agencies to invertebrates just because we have cannot notice them directly. Furthermore, can the concept of "personality" be applied to plant or would we be falling straight back into anthropomorphism?
1 December 2010 08:34

Memoring said...

I've just read the discussion right through; an experience certainly of seeing something living, but not so much of watching one singular thing grow and flourish as of experiencing various shoots: vigorous, alive, quickening. It's this reading experience of the discussion itself as something vegetable that inspired me to comment. I think that Giovanni's early injunction to think about the form of the original article is important here. He says that the function of a newspaper piece is, effectively, to inform (i.e. about new salient empirical information about plant ontology). But he also raises the issue of rhetoric and the pragmatics of communication, by asking "How else would [it] engage a wide audience on such topic?". I believe that the form of Angier's piece does indeed frame how it can be read and received...and not in a good way (as they say). For example, its rhetorical effects are gained by overplaying false binary oppositions (human-animal; vegan-omnivore; mammal-plant) in order to situate the knowledge she wants to impart in n context that readers will recognise. That context (the ethics of meat-eating) is itself by now so over-determined that adequate public discussion of it is nearly impossible; instead such basically flawed oppositions consistently form the logic by which it makes sense in the public sphere. The underlying question that the article poses—we've thought about animals, what about plants? —is crucial; but it is not well served by its rhetorical-logical form. This is because the binary conceptual network immunises against the real threats that thinking about plants might pose. How much is all of our thinking about ethics conditioned by the syntax of subjectivity and action/passivity that language can't avoid? How do we make any decisions at all in a world that is made up of multiple and heterogeneous relations of difference and similarity, rather than identity? Similarly I think the question of whether or not anthropomorphism is (just) anthropocentrism relies on too simple a conception of representation that assumes a too rigid opposition between the (inhuman) object world and the (human) representing subject. I would much rather argue that all representation is fundamentally inhuman, both its functioning and its objects are perpetually beyond our capability. So: I'm essentially unhappy with the newspaper opinion piece itself as an 'organ' for this kind of thinking. [...]
1 December 2010 16:54

Joe Zammit-Lucia said...

Giovanni, I understand that you were referring to the concept. I guess my point, not very well made in my post, was that we cannot really avoid thinking and communicating in a human-defined way. So 'individuality' is a human-defined concept and, even among humans, has a meaning that is different in different human cultures. It is likely to mean something totally different among ants or plants than among humans but we can only talk about it in our way and apply it to ants. Or, looking at it another way, we can only look at ants or plants and interpret within a limited set of human constructs. The search for objectivity is futile and delusional and interpreting things within the arbitrarily constructed and self-referential human framework of science does not get us any closer to such objectivity. As Memoring points out "How much is all of our thinking about ethics conditioned by the syntax of subjectivity and action/passivity that language can't avoid?" I suspect that we are all in agreement with Memoring's point that the debate will not "produce a single answer on how 'humans' should live in the world with plants". As he suggests, the value of such a debate is to show exactly the opposite - that there is no single answer and that we should be open to looking through very many different windows rather than attempting to find 'the answer' or to give one or two windows of the world some sort of primacy over others.
2 December 2010 07:26

Matthew Pianalto said...

"The search for objectivity is futile and delusional and interpreting things within the arbitrarily constructed and self-referential human framework of science does not get us any closer to such objectivity." This strikes me as overstated. Let's recall Angier's article. We have wonderful descriptions of the complex activity of plants in relation to the surrounding environment; the claims about the physiology are, or legitimately aspire to be, objective. Now it's true that questions about "objectivity" arise when this activity (or behavior, if you prefer) gets described with language (and particularly verbs) that usually imply intentionality (or subjectivity). Charitably, perhaps what you (Joe) mean by the futility of the search for objectivity is the search for objective criteria for ascribing *agency* (or intentionality or subjectivity) to other beings, and perhaps along with this the search for an objective criteria for determining the "moral standing" of some being. The point then would be, I take it, that the model of objectivity that's useful, say, in chemistry (or something like that) should not be a universal model (or standard) for all of our judgments, beliefs, and ascriptions. And with that I certainly agree. Are plants "agents"? Let's look at Angier's article. It certainly doesn't seem *that* forced to use some intentional language, but perhaps what makes some people uncomfortable about all of this (and maybe this is connected to your remark about objectivity) is that it's very hard (impossible?) to determine just where "scientific description" ends and "poetic/metaphorical flourish" begins. Maybe this is why a *news*paper seems an odd place for her piece--she's not just "reporting facts" but also allowing her poetic imagination to frame facts about plants in a way that throws into question the easy assumption that plants have no agency. Facts matter. But what we make of them also matters (and so poetry matters). And it's right to remind us that what we make of them (normatively speaking) never follows merely from the facts themselves. Maybe an interesting thought here is that if we take the facts about plants that Angier gives as true "news" to many readers (and Angier), then it is not surprising that the present language is ill-suited to capture in any non-contentious way the possible significance of these new discoveries. (So in a certain way, we could see the poet as someone trying to find a way to make language "fit" the world--to get it to fit--and faithfully express--the novel and the strange, which is hard, since language is predominantly shaped by the everyday and the mundane. And perhaps that includes most of the language one finds in the newspaper...)
2 December 2010 09:10

Giovanni Aloi said...

There are a few distinctions there to be made, Joe. I do not think anyone is here advocating a search for "objectivity". The opposite is indeed true. The question of the plant, or that of the insect, poses a further question for new methodological approaches. Of course these will be in some ways informed by the human condition. That should not however prevent us from attempting to shape new methodological approaches, instead of relying on what is already there. Ultimately, as anthropomorphism does not work with plants and insects, we simply do not engage with them on other levels than the objectival/scientific. As you rightly point out at the end of your entry, "there is no single answer and that we should be open to looking through very many different windows rather than attempting to find the 'answer'. However I think we can safely say that when it comes to plants and insects, one window is all we currently really have and that is 'the scientific'. At present it seems to me that the only other window available is the anthropomorphic, which in this case has a very misty pane.
2 December 2010 09:32

Joe Zammit-Lucia said...

"Facts matter. But what we make of them also matters". This is the crux of the matter. First I'd like to elaborate on what I mean by the futile search for objectivity. Science, like all other human disciplines, is a cultural construct. Let's move away from science and take accounting as an example. Accounting is a set of conventions that let us to describe the financial state of an entity in a way that allows us to understand the same things by the same words and numbers. The trouble starts when we start to believe that accounts somehow give us a set of 'facts' rather than merely a set of descriptions within an arbitrarily defined set of conventions. A new set of conventions might well convert these 'facts' into lies. That is the limitation of any arbitrary construct. Now take science. We have defined what we mean by the 'molecule'. Then we assign it something that we call 'weight'. Then we claim that the molecular weight of sodium is a 'fact'. It is nothing of the sort. It is a description (a legitimate one) within a set of cultural constructs that we call chemistry. It is only a 'fact' within those self-referential constructs. I have nothing against these different constructs. Indeed, they are

essential. But I feel we must not lose sight of what they are. I prefer to think of them as a language that allows description and communication in terms that are generally understandable. I take a post-structuralist view of language and am not convinced by the idea that we are being presented with 'objective facts'. Hence my comments that the search for facts is futile. Moving on to Angier's article, it has, broadly, 3 components. The first is observational and descriptive. She describes things about plants and does so using the arbitrary language of science. The second stage is interpretative. She takes these descriptions and suggests that a possible interpretation is that plants are 'sentient'. She does not grapple with what it means to be 'sentient' but instead uses a new language that encourages a whole lot of cultural baggage in the interpretation. She makes a statement like "Some of the compounds that plants generate in response to insect mastication — their feedback, you might say — are volatile chemicals that serve as cries for help." She borrows the language of science ('compounds'; 'mastication'; 'feedback') and then abandons it for the sting in the tail which she couches in emotive terms. By calling them 'cries for help', she is poetically tempting us into the concept that plants are 'sentient'. Throughout the article, she uses words like 'howl', and 'eavesdrop' – anthropomorphic interpretations designed to ensnare us in the idea of plant sentience. Finally, the third step - she hints at the idea that, if we buy into the idea of plant sentience, this may have some implications in terms of normative ethics relative to our behaviour towards plants. In this sequence, science has only informed the first step - that of observation and description. At best, this constitutes 'information'. "Knowledge" comes only from the next two steps: interpretation and implications. In this context, I still fail to grasp the idea that we have only science (which science?) to grapple with plant and insect issues. Surely many other disciplines including philosophy, art, literature, economics, etc have addressed many relevant issues. Through the natural sciences, we have descriptions of the morphology, structure, chemical, cellular, molecular and sub-molecular components of plants and insects. We also have descriptions of their functions, physiology, behaviours, physical mechanics, and so on and so forth. But where does all this get us in terms of creating a normative ethics of how we engage with plants and insects. Precisely nowhere.
6 December 2010 20:35

Adam Dodd said...

Joe, I think it's worth keeping mind that the term "fact" is derived from the Latin "factum" meaning "that which is made or done." A fact is thus never something "discovered," but rather is always something produced or enacted. From the early modern period, artificial knowledge becomes supplementary to (and in some cases, replaces) Aristotle's self-evident or natural knowledge. That knowledge is artificial (i.e., made by humans) in no way compromises its truth, within the scientific episteme established some 400 years ago.
10 December 2010 01:07

Joe Zammit-Lucia said...

Thanks Adam. Fair point. I guess as long as we remain conscious that scientific 'facts' and 'truth' change over time, then we can just accept them for what they are. I thought that this viewpoint from Peter Singer may be pertinent to Angier's piece: "they use language metaphorically and then argue as if what they said was literally true. We may often talk about plants 'seeking' water or light so they can survive, and this way of thinking about plants makes it easier to accept talk of their 'will to live', or of them 'pursuing' their own good. But once we stop to reflect on the fact that plants are not conscious and cannot engage in any intentional behaviour, it is clear that all this language is metaphorical; one might as well say that a river is pursuing its own good and striving to reach the sea, or that the 'good' of a guided missile is to blow itself up along with its target." As I said before, I don't hold with Singer's view of only according respect/rights/whatever to sentient beings but I think that his excerpt above is relevant to Angier's piece where, except through the use of metaphorical language, the piece provides no evidence whatsoever of sentience or intentional behaviour in plants.
10 December 2010 09:47

Giovanni Aloi said...

Sorry, but I do not find Singer's view particularly helpful here for the simple fact that his comparison between plants, rivers and missiles is, with all respect, ludicrous. Simply put, missiles are man-made objects; plants are not. Rivers are ecosystems; plants are not. Plants are living beings; Animals are living beings too. The main issue at stake here is that Singer is talking about plants from the same position that Descartes would have taken with regards to animals in his own time. Where does Singer find evidence that plants are not conscious and do not engage in intentional behaviour? I would be very curious to

know. I am copying below the introduction to a recently published essay by the title "The 'root-brain' hypothesis of Charles and Francis Darwin Revival after more than 125 years" (František Baluška, Stefano Mancuso, Dieter Volkmann and Peter W. Barlow, Plant Signaling & Behavior 4:12, 1121-1127; December 2009; Landes Bioscience) "Recent advances in plant molecular biology, cellular biology, electrophysiology and ecology, unmask plants as sensory and communicative organisms, characterized by active, problem-solving behaviour. This new view of plants is considered controversial by several plant scientists. At the heart of this problem is a failure to appreciate different living time-scales: plants generally do not move from the spot where they first became rooted, whereas animals areconstantly changing their location. Nevertheless, both animals and plants show movements of their organs; but, as mentioned, these take place at greatly different rates. Present day results, however, are increasingly coming to show that, in contrast with the classical view, plants are definitely not passive automatic organisms"
10 December 2010 15:27

Joe Zammit-Lucia said...

Giovanni, yes I agree Peter Singer's passage is weak. It is also circular in that the argument he uses to underpin the fact that plants are not sentient is that they are not sentient. But the reason I posted it here is that I believe his point about the use of metaphorical language and passing it for fact is absolutely right - and Angier's article is a prime example. Personally, I am excited by the idea of plant sentience. But I find that Angier's article totally unconvincing in pushing me further in that direction. If we stripped the article down to the scientific descriptions only, I am sure that we could all re-write the article and use the same science as an argument against plant sentience. It would be easy to do. The passage that you put forward in your last post is also full of metaphor. Of course without reading the full paper it is impossible to know whether the metaphor is a reflection of the science or whether it is metaphor a la Angier. Be all that as it may, as I said in my first post, in my opinion if the objective of all this is to define what might be 'appropriate' human behaviours towards plants, then I believe that the debate about sentience is the wrong debate to be having as it further embeds the idea that sentience is the determining factor for our ethical choices. The longer the debate about sentience, the further this idea becomes embedded. To my mind, that's undesirable and counter-productive.
12 December 2010 09:16

GREGORY PRYOR: POSTCOLONIAL BOTANY

Gregory Pryor has been a visual artist for 30 years. From a background in painting, Pryor's practice has evolved into many different areas, including drawing, video, performance and object-based work.
Interview questions by **Giovanni Aloi**

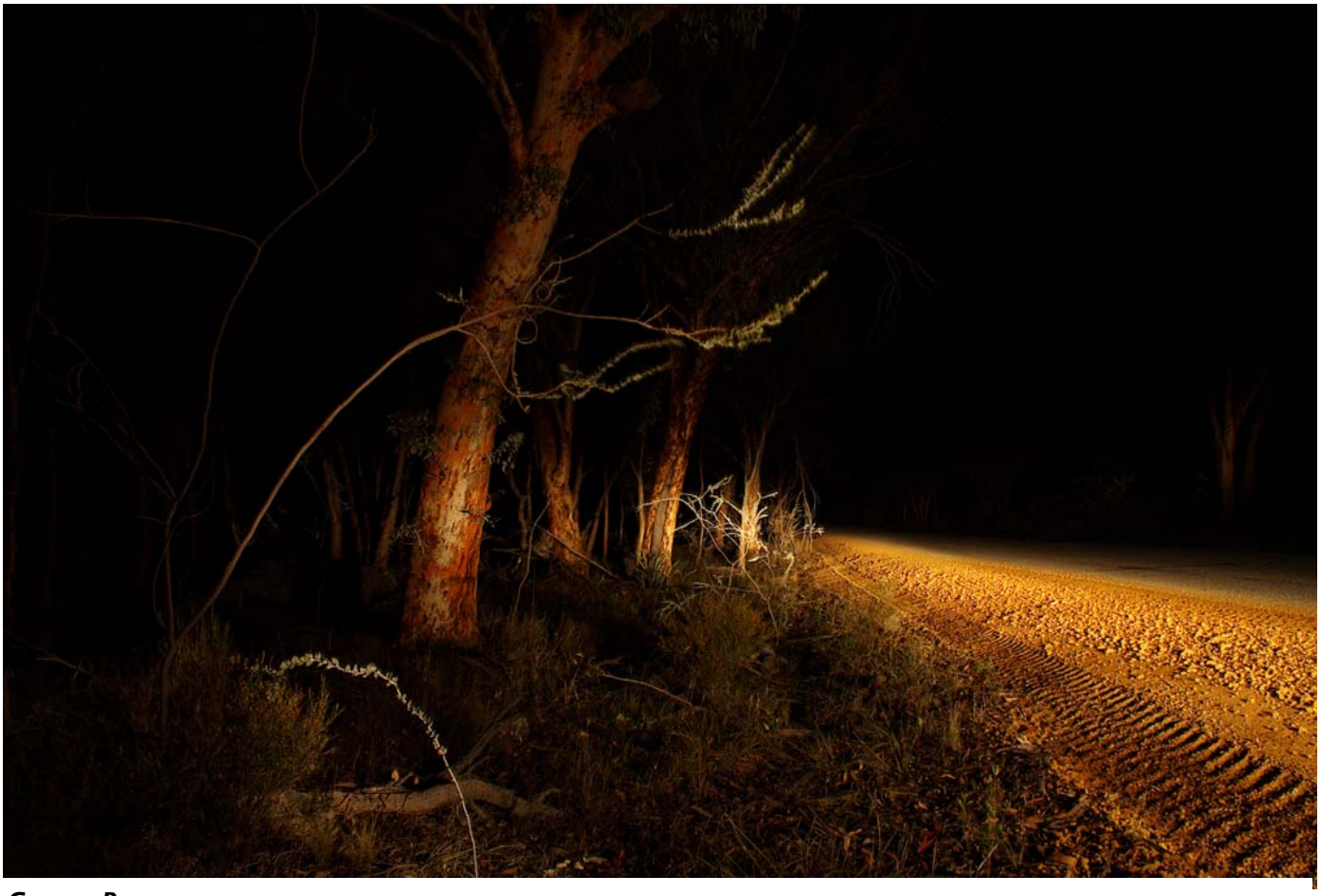
Travel has played an important role in Gregory Pryor's work and after many years traveling through Europe and Asia in 2003 he moved from Melbourne to Perth and began to explore the visual language of the country he was born in. His most recent projects are *Overland to Underwood*, an exhibition of paintings shown at Lister Gallery in Perth – based on field trips to the salt lake country south east of Kalgoorlie in Western Australia – and *Miracle of the Legs*, a sculptural on-site work commissioned by Stour Valley Arts in Kings Wood, Kent in the UK. Gregory Pryor is represented by Lister Gallery, Perth.

Gregory, tell us about your interest for plants and how it came to become key to your work as an artist.

I have always been interested in landscape without really understanding what it was and where the entry door into it was located. My education was infused with the landscapes of the northern hemisphere and through the children's literature I was exposed to (such as Enid Blyton's *The Magic Faraway Tree*) I grew up with a strangely abstract longing for a landscape I had never really experienced. The suburban gardens which proliferated in my neighbourhood were more or less imported or transplanted according to an English template (primarily the 'cottage' garden) and this extended to the countryside, which I was conditioned into thinking, should consist of lovely, lush rolling hills with cows and not many trees. Of course I had some exposure to the Australian bush, but for the most part, I grew up ignorant of what the landscape of Australia was really like. Even at art school, I was drilled with cultural models of landscape from elsewhere and my first paintings from that time adopted a more or less renaissance/classical model of landscape – trees and rocks were there to provide a neat architectural space to admire or as a receptacle for some sort of human tableau. I eventually realised there was something else out there and that one day I would need to look at Australia. Like many Australians, I didn't dare venture too much into the interior.

Before turning my attention to this ominous interior, I shifted my research interests to the eastern landscape traditions of Chinese painting. This was a critical transition for me, as I now began to work within a less architectural or framed space and subsequently more dynamic possibilities emerged; of a 'landscape without beginning or end'. If the western landscape was square, the Chinese model provided something round for me, something that rolled/unrolled, just like a scroll.

Ironically, the final stepping stone in my pathway to working with the landscape and plants of Australia came through immersing myself in a similar forest to the 'abstract and faraway' one I had been exposed to in my childhood. In 2000 I spent 5 months in a remote little village called Topolò (home to an annual contemporary arts



Gregory Pryor
Acacia Merrickiae, 2006 Archival pigment print, 80 x 120 cm © Gregory Pryor

event called Stazione Topolò/Postaja Topolove) in north eastern Italy, on the border with Slovenia. During my time there, I tracked the passage of three seasons, from winter through spring and into summer and it was here that I decided to observe very closely (and through the monitor of my first digital camera) what happened. Through many walks in the forest, I looked at bare trees and light, leaf litter and snow. The first changes came from the ground when *bucaneve* (or snowdrops) pushed a 'hole in the snow'. Eventually, my focus shifted to the arboreal, when tiny buds first started to transform the shape, colour and texture of the bare branches and twigs. Landscape subsequently became something made up of much smaller component parts and when I went to Western Australia for the first time in the spring of 2003 and saw the incredible floral diversity, I knew I had finally found the entry door to my understanding of the Australian landscape – through the plants.

How do you incorporate your focus on plants and landscape in your teaching practice?

In reality, it doesn't feature so prominently or directly. I have been in discussion with some of my colleagues, the artists Nien Schwarz and Paul Uhlmann who share a similar interest in the landscape and environmental issues about designing a more regional, environmental focus in our curriculum, but it is extremely difficult to get support for this in a climate of more generalist undergraduate courses and for more internationalism at post graduate level. We do however, have a research centre into landscape and language which I contribute to periodically.

I know you are an expert gardener and that you have a particular penchant for Australia's native species. That of 'native species' is a very complex and multifaceted issue. Generally we are inclined to think that it is our duty to preserve the biodiversity of ecosystems, especially when there is striking evidence that 'our doing' has caused the appearance of 'foreign species'. There is a sense of wanting to preserve nature "untouched" as if we never existed and our actions had no impact on it. However,

could we argue that white humans are not 'native of Australia' either? What do you think?

Yes, spot on. It is difficult to think certain thoughts walking through the landscape here when I am continually reminded of and blinded by the pigmentation of my skin. My life as a gardener is far from achieving 'expert' status! It is really just beginning and rather than feel as if I am 'recreating an Australian Eden' (despite recently moving to an area called Eden Hill!), I see the challenge and responsibility of gardening more along the lines of *repatriation*. On July 10 of this year, the head of a famous aboriginal warrior called Yagan was repatriated back to an area of earth not far from where I live, after being separated from his body for 177 years and spending time in the Liverpool museum (and then buried in Everton Cemetery). The garden I inherited here may as well be a fragment from a British horticultural museum, so by digging it up and replanting it with species that are indigenous to the area, I feel as if I am *repatriating* the foliage. I can never hope to fully re-establish what took millennia to form, but there is a sense of applying a more beneficial realignment to the patch of earth where I live.

In a way I feel I can learn from the Chinese Ming scholars approach to the garden. There was a clear indebtedness to the 'wilderness' in how they designed their garden, but it was also extremely cultured. It was, in a sense, a book. My 'book' will no doubt reflect my alien status on the land, but I am at least hoping that it will show that I am talking with it.

"Naked was an exhibition of paintings that investigated the reliance early colonial artists in Western Australia had on the conventions of landscape painting according to a European (or more specifically, English) classical tradition. The exhibition asked: Did early colonial artists contribute to the clearing of the land through the provision of an inappropriate template of landscape use?"

Just as contemporary botanists grapple with the genetic provenance of the plants they study through increasingly specific DNA analysis, I have felt it necessary to unpack the threads of knowledge and experience that contribute to my idea of art and my approach to art practice. I have built whole exhibitions on knowledge that was cantilevered. There was an anchor point there, but it stuck out into space awkwardly. I have since realised that there was a lot of further knowledge that could have better supported the idea behind these shows.

How important is historical awareness in your practice?

After working closely with wheat farmers on a project in the Western Australian wheatbelt in 2005 called *Grain of Night*, it occurred to me that the massive land clearing which has taken place in Australia was not necessarily attributed to solely economic considerations. In relation to what I have previously said, I had also 'cleared' the Australian landscape from my consciousness. The colonial painters which made up so much of my early art history lessons, painted the 'idea' of landscape, rather than what was in front of them. For many of these painters, this idea was seen through an English or European lens. An awareness and understanding of this was critical if I was to proceed in my own examination of the land and its plants.

What is Iron Ball Taxonomy *about?*

There was a post war government policy in Western Australia that allowed one million acres of native bushland to be cleared every year as a way of opening up more land for broad acre agriculture (this continued in some form, right up until the late 1970's). I had long been morbidly fascinated by the archival newsreel footage of this razing taking place. Often tractors pulled huge iron balls connected by massive chains through the landscape, shearing everything in their path in the most violent manner imaginable and then huge fires were lit to remove all traces of what had once existed. I wanted to make a parallel between this clearing and the 'clearing of names' that took place when British and European botanists began to collect, classify and name the plants from Western Australia in the nineteenth century. Many of these plants already had names, used over millennia by various groups of aboriginal inhabitants for food, medicine, and a myriad of other uses.

In the Northern hemisphere, these plants were often named after botanists, gardeners, collectors or patrons (almost exclusively male) who never set foot in Australia. The aim of *Iron Ball Taxonomy* was again, in a sense, to *repatriate* the original names of some of these plants. The long, rusted steel chain which connects the iron balls in this work has a number of metal 'tags' attached, bearing the Noongar (the aboriginal people of the

Gregory Pryor
Iron Ball Taxonomy, 2007 Installation shot at Lawrence Wilson Art Gallery, Perth © Gregory Pryor

South West of Western Australia) names for some of the iconic plants of this part of the world. This 'ball and chain' also quite literally referred to the incarceration of Australian aboriginals through the colonial period. Many, tragically and ironically were employed to help clear the very land that their ancestors had worked so hard to develop a symbiotic relationship with. The ball and chain in this work is laid out over the smoky glass of a long vitrine under which are laid out the dried botanical specimens of the plants named on the rusted tags, labelled with their full binomial name used in science.

Most of your work revolves around plants, but also focuses on the concepts of environment and landscape more in general. Can you tell us how the Australian landscape influences your practice?

As I previously mentioned, when I moved to Western Australia (in 2003), I knew it was the beginning of an association with landscape. My previous experience of 'entering' the landscape was an experience one might get when walking through the front door of a house or building. There was a sense that the landscape enveloped you spatially, on all sides and with a canopy overhead. This was extremely evident when walking through European woods. It was so benevolent and ordered – the trees may well have been furniture (and in fact, I grew up with furniture made primarily from northern hemisphere woods). The Australian bush however, is not so well ordered and comfy. It is extremely volatile. The eucalyptus species that predominate are full of highly combustible oils. They shed bark regularly in long messy ribbons and limbs constantly die and fall off, making for an 'untidy' forest floor. Growth is irregular and often shaped by the harsh climate. The leaf litter underfoot is brittle and noisy. We are definitely outdoors and exposed. These often confronting characteristics are what interest me here – both aesthetically and conceptually.

The south west of Western Australia is one of the oldest exposed patches of earth on the planet, having avoided ice for a much longer period than elsewhere. As a result, the earth is flat and denuded, but a unique, bio diverse membrane has formed over the exposed landscape. The *kwongan* (or heathland) of Western Australia is a unique landscape experience. When walking, you look down on it, with almost a bird's eye view, rather than have it wrap around you. So rather then feeling as if you are in a domestic interior, you are definitely outside with a strange, almost vertiginous sense of your own verticality. Further complicating this is the fact that in some areas, the *kwongan* has an incredibly dense biodiversity that exceeds even some of the world's lushest rainforests.

A key reference here would have to be the writing of George Seddon, (see *Mausoleum* in Antennae #10) who wrote extremely lucidly of his own encounter with the ancient landscape here. Many of the plants are extremely tough and prickly and the influence of the landscape on my work could be summed up in a similar way – it is in a constant state of response to being scratched and poked and obliterated by light and swallowed by night.

You have extensively travelled abroad as an artist in residence and have created site-specific work in forests and gardens around the world. What are the challenges presented by working with a different environment from the Australian one?

When I was invited to develop a work in response to King's Wood in Kent in the UK in 2008 through Stour Valley Arts, my first response was to make a work fuelled by thoughts of *revenge*. As I have mentioned earlier in this interview, I had grown up acculturated with a strong bias towards England that had blinded me to the landscape of my birthplace. I thought of all the early colonial artist's 'English versions' of the Australian landscape and now saw a prime opportunity to exorcise this cultural brainwashing I had received! I decided that somehow I would superimpose what I had subsequently learnt about the Australian landscape and it's plants onto an English landscape. I wanted to 'overwrite' the falsehood I had been fed. So this was the challenge for me – dealing with a landscape that was my 'post-colonial' master! Ultimately, such mutineering didn't eventuate into anything concrete for this project, but I still think I need to do it at some point!

The other challenge or 'impediment', was the bias of art history. So much of my learning (from both the east and the west) focused on images of landscape from the Northern hemisphere. A substantial contributor to the development of modern painting in the west it could be argued was developed from the way brushstrokes and colour responded to the foliage and branches found in the forests of Europe. As mentioned previously, these are ordered spaces and sort of handy if you are trying to work out how to break open and understand the formal elements of painting. The whole idea of Cezanne painting *sous b*ois or 'under wood'

Gregory Pryor

Iron Ball Taxonomy, 2007 Installation shot at Lawrence Wilson Art Gallery, Perth © Gregory Pryor

fascinates me, because he obviously felt secure there in the neat, sometimes cathedral like order of the southern French forests. It seemed to register with him in a manner not unlike his sketching visits to the long galleries of the Louvre.

In a recent series of paintings *Overland to Underwood*, I set out to enter the *sous bois* of the Australian landscape and begin to try to articulate how different it is. Here, the order is at times indecipherable and it is a space of extreme clutter, chaos and volatility. So the challenges are probably greater for me in dealing with the landscape of Australia, simply because my schooling has been shorter. The experience of travelling to more tropical regions presents different challenges. In comparison to what I experience here in Western Australia, my first response when moving through the lush and vertiginous landscape of Taiwan (where I have been working) was that it was like a freshly born baby. The landscape seemed so young; writhing and slithering and moving with an animated awkwardness. Soils are rich and superabundant with plant life, as opposed to the nutrient deficient sands of the Swan coastal plain and the ancient rubble of the Yilgarn plateau that the unique plants of Western Australia have evolved to survive in.

In this respect, the broad expanses of Australia allow an artist to deal with negative space, the void, and concepts of blandness, nothingness and infinity, as opposed to the well-travelled and documented forests of the North.

How much of the history and biological reality of the place do you embrace in your practice?

Yes, I think this is very important. Insects, animals and plants are key stakeholders in my receptivity to place when I travel, even when I eat them! (well, not so many insects!). Most of the time, they have been in that place a lot longer than I have and a lot longer to other man made stuff that often shape our journeys, so they become a bit like conduits to pre-knowledge for me. It is easy for me to shut out the cosmetic structures that sit on the land, but not so easy to shut out a plant, animal or insect that is a 'survivor' or opportunist, clinging to life in a place. And despite having a reasonably functional sensory network myself, I still need to read books, look at maps and talk to people about what is real and what is not, what is 'natural' and what has been substantially shifted, manipulated or created in the environments I enter. It is very difficult to see layers sometimes, so research is critical.

Can you tell us about Phantom Limbs *and the* Taxonomy of Weeds?

When I first arrived in Western Australia, I did a durational performance as part of a festival of live art in 2003. The festival took place at a disused rail yard and workshop in Midland, a working class suburb of Perth. The performance was called *in arenosis ad fluvium cygornum* – a term used by early botanical collectors to describe the soil of the swan coastal plain where they collected specimens. For a few months before the festival, I took many walks over a large block of land adjacent to the workshops that had housed the painting workshop where trains were painted. The soil was full of heavy metals from the paint and was going through the process of environmental 'correction'. The land was covered with a variety of weeds or alien species to the area – opportunistic plants of the most virulent type. I began to identify each species, learning the taxonomy of weeds and where they originated. Their presence on this disused block was in an area near where some of the early botanical collectors like Ludwig Preiss collected many type specimens.

I began to be interested in the idea that plants could possess phantom limbs and that botanical collectors were the surgeons responsible for the 'amputations'. This idea surfaced when studying old specimens in the herbarium of the Naturhistorisches Museum in Vienna. Specimens were often dipped in extremely toxic liquids like mercuric chloride (a heavy metal like the ones in the soil in Midland) to prevent the invasion of museum beetle. The mounting papers absorbed these chemicals over time and when specimens were remounted, they would often leave behind a ghostly impression of their form through the stain left by the chemicals. Dried specimens would also regularly break and pieces would then be stored in a paper envelope attached to the specimen page. The broken detached 'limb' would then be represented by a 'phantom limb' impression in the empty space, again, courtesy of the mercuric chloride. Some of these ideas were expanded upon in a short essay written for the catalogue of the festival.

The work I eventually undertook in King's Wood for Stour Valley Arts in 2009 (*The Miracle of the Legs*), built on some of these ideas and three wooden legs modelled on people with a special affinity with the forest were attached high up in the beech and sweet chestnut trees of the wood.

In the film Avatar*, the Tree of Souls (Vitraya ramunong) is a bioluminescent weeping-willow like tree which functions as a direct*

Gregory Pryor

Black Solander, 2005 Installation shot at the Perth Institute of Contemporary Art © Gregory Pryor

Gregory Pryor
Black Solander, 2005 Installation shot at the Perth Institute of Contemporary Art © Gregory Pryor

portal to Eywa, the guiding force and deity of Pandora, as well as establishing a network between al Na'vi that allows them to communicate through an expanded sensory awareness. The Tree of Voices, functions instead as a historical collective memory that allows the natives to hear the voices of their ancestors. Most visible of all in the film is however the giant Home-Tree, standing at roughly 460 meters tall, this is where the leading clan lives. On Pandora's, it could be argued that plants have overtaken animals in the forming of vital relational modes. What do you think of this proposition which sees plants at the centre of the spiritual life of a civilization?

Yes, it has much credence. Whilst working in Kent, I investigated the very ancient yew trees that are often growing near Christian churches. Some seem to be growing in a circular pattern and it has been suggested that many medieval churches were built on sacred sites in use since pagan times and that the yew trees were significant in religious rites and loaded with spiritual associations. If something has been around for a long time, it seems only fitting that it is allowed to wear the badge of the spiritual.

W. G. Sebald wrote about the loss of large old trees in the freakish English storms of 1987 in *The Rings of Saturn* as if something absolutely vital had been removed from the psyche of the entire English nation. This storm arrived as the final destructive act after Dutch elm disease and drought had caused massive losses of iconic trees and weakened many, making them prone to the powerful winds that lashed the nation during the storm. The denuded landscape and the silence that descended on the land after the storm (and after the clearing of the debris) is described in rather apocalyptic language as an almost soulless place:

> It seemed as if someone had pulled a curtain to one side to reveal a formless scene that bordered upon the underworld. And at the very moment that I registered the unaccustomed brightness of the night over the park, I knew that everything down there had been destroyed.
> (Sebald W. G. (1998) (Hulse, M. trans.): The rings of saturn, Vintage, London, p.266)

Another work from Overland to Underwood called Flowering (mourning), is of a single tree growing

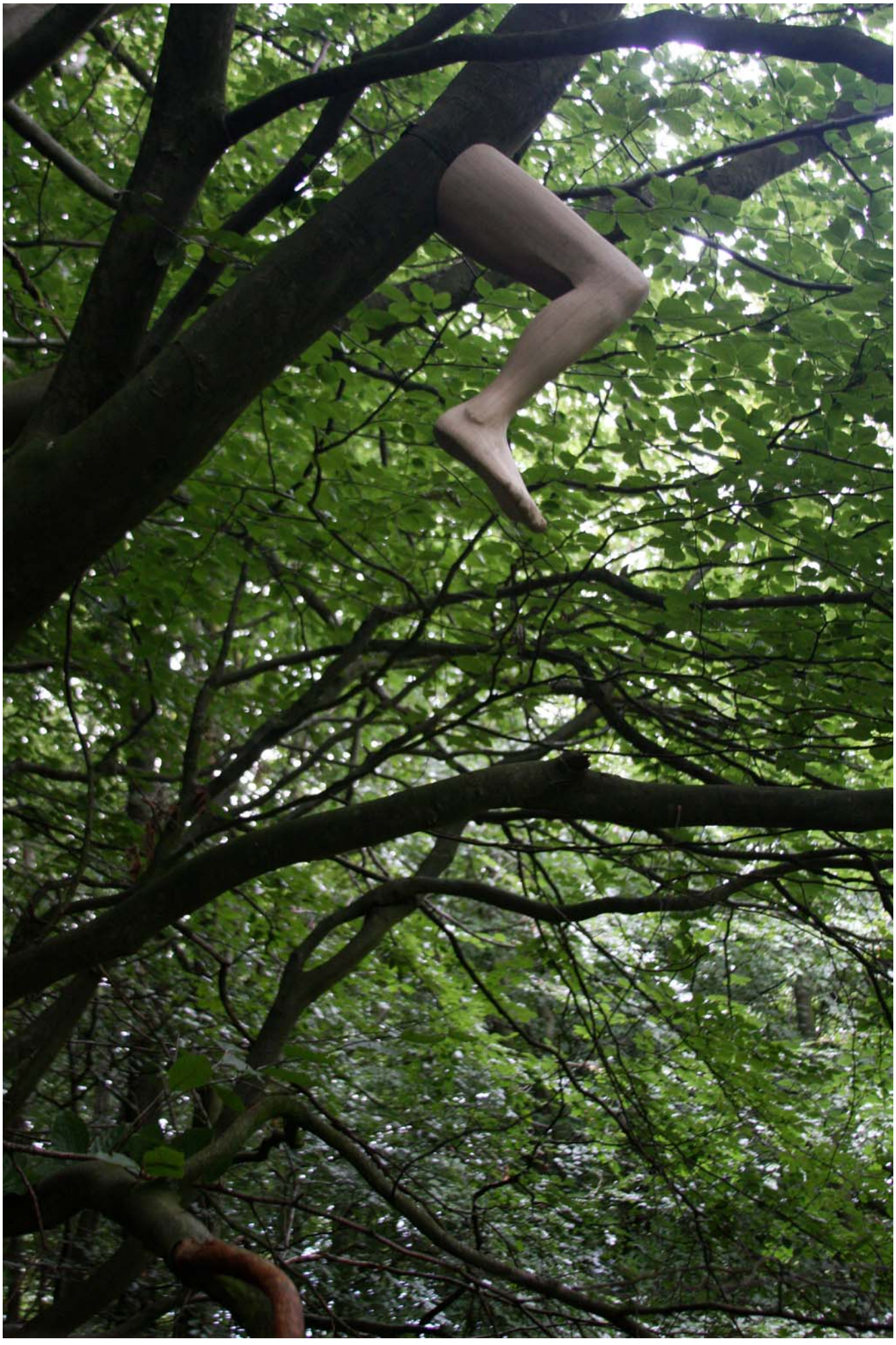
Gregory Pryor
Flowering (mourning), 2009 oil on linen, 330 x 372.5 cm © Gregory Pryor

besides a salt lake in remote country south east of Kalgoorlie in Western Australia.

Colleen Haywood, a Noongar woman and colleague at Edith Cowan University (and head of Kurongkurl Katitjin, the Centre for Indigenous Australian Education and Research) saw the work in the studio just after I had finished it. Of all the works in the studio, she seemed continually drawn to this one and when I showed her some field photographs I had taken of it, she was convinced I had painted a spirit or sacred tree. For aboriginal Australians, trees and plants are definitely at the centre of the spiritual life of their people.

Scientific attention to plants is currently rising dramatically and it is therefore only appropriate that the arts and humanities devote some attention to this shift. The Laboratorio Internazionale di Neurobiologia Vegetale (the International Laboratory of Plant Neurobiology) was founded in 2005 in Florence and, ever since, it has greatly contributed to the scientific debate on plants' cognitive and sentient qualities. What is your take on plant cognition and how much of this notion has an impact on your work?

Following on from my answer to the previous question, Colleen Haywood expanded upon the depiction of trees and plants in my work in such terms. She talked of the trees 'watching' the people who passed by them and what the Neurobiologica Vegetale is investigating has been



Gregory Pryor
Miracle of the Legs (Kate), 2009 oak, installed in King's Wood, Kent, UK © Gregory Pryor

recognised through many civilizations, particularly in conjunctions with spiritual belief. The myths surrounding plants like the mandrake only develop through some sort of psychic and biological relationship. My take on all of this is mainly intuitive and is alluded to rather than focused on in my work.

One of the main issues related to the understanding of plants outside the scientific field lies in their slow movement. In animals, behavioral responses are identified and measured through responses that materialize in rapid movement. Have you ever encountered challenges related to this aspect of plant life in your work?

The more I have studied plants, the faster they get! Learning about the details of germination and the responses and processes they go through, such as seasonal changes or relationships to other plants, insects and animals makes one aware of how expert plants are at movement. Their incredible skills at opportunism are also testimony to their speed of adaptability and survival. Here in arid Australia, it is common to talk about a 'floral explosion' that takes place in the desert after a rare rain event. This is not the language of slowness.

There is also a genus of plant endemic here in Western Australia called *Stylidium* or trigger plants. They have tiny, complex flowers with a concealed, 'spring loaded' floral column that is activated as soon as an insect lands on the petals. Again, the movement here is fast and precise and necessary for survival, as the insect is hit on its back (or sometimes underneath) with pollen that is then carried to the next flower it visits for pollination.

For visual artists, the convenient 'static' quality of plants (i.e., rooted in the earth or placed in a vase or dried and placed on a specimen sheet) compared to animals means that animation becomes conceptual or implied, rather than representative.

Eduardo Kac's interest for plants developed in 2003, when he started working on his project* Edunia*, where, common petunias were engineered to contain the artist's DNA. What is your take on transgenic art involving plants? Is this something you may be interested in exploring in the future?

Well, this sounds and looks fascinating, but I have 'drawn a line' in relation to this area of working with plants. My conceptual position is from a distance – an observer rather than a participant. When undertaking *Black Solander* at the Perth herbarium, I became more and more interested and drawn into the biology of the plants I was studying/drawing. Eventually, a botanist lent me a microscope and I must say my first reaction when looking through the lens at the 'anatomy' of a plant was one of rejection – almost repulsion! I don't want to sound lily-livered or anything, but I realized I felt less secure and comfortable crossing the threshold of what the eye can see and into this explicit world of plant biology. Perhaps it is my well trained objective painter's eye that holds me at arm's length, but I really think it is more to do with my interest in the 'bigger picture' in landscape, rather than the bigger picture that emerges in the laboratory on a microscopic, molecular or genetic level.

Black Solander ***is one of your most important works of art. Where did the idea for the installation came from and which challenges did the making of the work present?***

When I began to think about making work about Western Australian plants, I was reading many accounts of botanical illustrators being defeated by the sheer complexity of the plants and the overwhelming numbers of them. Ferdinand Bauer did over 2000 drawings of Australian plants whilst on board Matthew Flinders' *The Investigator* in its circumnavigation of the continent between 1801 and 1803, but spent almost 9 years finishing a group of only around 220 as full colour watercolours. I began to realise that this approach was very, very slow and I would need to tackle it differently. The biodiversity in Western Australia is immense – somewhere over 10,000 species and I realised that if I wanted to draw attention to the threatened status of over 3000 of them, I would need to make a big statement. A complete flora of Western Australia had also eluded botanists, so I decided to draw every species identified at that time. This was when the calculator came out and I began to do some number crunching. In the end, my main challenge was time. I worked out my available time before the exhibition deadline (it was only about six months) and the number of species I would have to draw. This then gave me a number I would need to draw each day or each hour. My degree of representation was then shaped by this limitation. The whole work was a race against time.

Gregory Pryor
Underwood 1 and *Underwood 2*, 2008 – 09 oil on linen, each work 140.3 x 208 cm © Gregory Pryor

How important is 'ecological engagement' in your practice?

The work I previously mentioned, *Grain of Night* (2005) was a collaborative project with the scientific organisation CSIRO sustainable ecosystems and focused on the work they were doing with the farmers of the Wallatin O'Brien catchment in the Kellerberrin district of Western Australia's wheatbelt (about 200 kilometres east of Perth). This work was probably the one where I most actively engaged with issues of ecology. There were various outcomes of this work, including a short video documentary, an extensive artist's blog and an exhibition of photographs, paintings and objects. My one main aim with this project was to try to avoid the clichéd visual representations of ecological decay, such as razed fields, saline affected land and dead trees. My 'ecological engagement' primarily occurred at night. I interviewed many farmers and scientists for this project and I combined this material with video footage shot at night. This 'after hours' approach afforded me more flexibility with the material without the often-misleading light of day to contend with.

Since *Grain of Night*, my ecological engagement has been undertaken with a 'soft diplomacy', through various field trips and academic work, rather than with a strident activism.

Which artist's work has thus far informed your own?

Kasimir Malevich, Sassetta, Piero Della Francesca, Ferdinand Bauer, Celia Rosser, Eric Rohmer, Jules Renard, Marcel Schwob, Ma Yuan, Giovanni Bellini, Paul Cezanne

What are currently working on?

Digging a large hole, making a garden, trying to paint the radiating spikes of *Xanthorrhoea preissii* as if they were the perspectival lines of Paolo Uccello's *mazzochio*

From a background in painting, Gregory Pryor's practice has evolved into many different areas, which include drawing, video, performance and object based work. After many years travelling to and making work about his experiences in Europe and Asia, he moved from Melbourne to Perth in 2003 and began to explore the visual language of the country he was born in. His most recent projects are Overland to Underwood, an exhibition of paintings shown at Lister Gallery in Perth which was based on field trips to the salt lake country south east of Kalgoorlie in Western Australia and Miracle of the Legs, a sculptural on site work commissioned by Stour Valley Arts in Kings Wood, Kent in the UK. Pryor is represented by Lister Gallery, Perth.

LOIS WEINBERGER: GREEN MAN

Weinberger states, "The way that a society treats plants is a mirror image of itself." His concentrated spaces for that which is marginalized, unpleasant and driven out of public awareness impart to the viewer a mental space of reflection and define a physical site in which aspects of naturalness and liveliness become visible and supersede all regulatory strictures. Weinberger thus repudiates the classical concept of art, customary work-forms and traditional artistic locations.

Introductory Text by **Tim Chamberlain**
Interview Questions by **Bergit Arrends and Jessica Ullrich**

Botanists are as explorers of old, living in the field, *out there,* in the wild grasslands, jungles and forests of the world. Constantly discovering new species in uncharted regions across the world's varied biomes and they sail home their treasures to a myriad herbaria and laboratories for classification, molecular chromatography and DNA analysis.

In the coldest, driest parts of the worlds, little evidence can be seen of any living plants however, for most human societies, plants are tightly woven into the fabric of society as food, shelter, healer and landmark. Plants also form the main component of the foundations of our planet's food-chains.

The survival of plants as foodstuff and as (biotic) climatic component is therefore inextricably linked with the continued existence of our species. As climatic changes induce more or less favourable growing conditions for any given species, so the components of a seemingly stable terminal succession community, the climax community, can change although with large slow growing species this may occur over many years. The net result is that absolute species compositions of any given habitat are in a state of flux.

Many plants and animals benefit from the conditions created by disturbances.[1] Ecological disturbance such as fire or flooding, as well anthropogenic disturbances allow for the invasion of plant species particularly adapted to exploiting recently disturbed sites and plant ecosystems can be remarkably quick to recover and (re)colonise. The term *ruderal* is given to species that colonise waste ground.

The global population continues to expand dramatically and so too does the pressure on resources and human communities. The question of whether there is now sufficient land to grow food for everyone as UN figures estimate over 850 million people currently suffer from hunger or malnutrition gives rise to the very serious projection for a not-too distant future: *Who in 2050 will feed the world?* [2]

The rapid spread of our towns and cities through widespread domestic and industrial development has been responsible for the destruction of critical habitats and for the 'tarmacification' of land on a vast global scale. This can often resemble a botanical desert.

'The garden' as human artefact and microcosm of nature within an urban setting is the subject matter for artist Lois Weinberger. It has vast amounts of cultural heritage and cultural baggage and by way of its creation through

Lois Weinberger
Green Man, 2004, c-print, 40 x 30 cm, edition: 5, photo: Paris Tsitsos © Lois Weinberger

human endeavor, it must also be seen as a physical manifestation of thoughts and ideas and an emotive response.

Artist Lois Weinberger (b1947) in association with Franziska Weinberger, creates sculptures, drawings, installations and interventions which act to investigate, and as a result to counter-act, the desertification of the human sphere, thereby casting a contemplative light against the falling shadow of a civilization hell-bent on eventual self-destruction. Far from aspiring towards a utopian Eden, they "prefer to focus on man-made places in which wild plants struggle to survive despite our best attempts to exclude them."[3]

Using a wide range of media Weinberger creates installations as new worlds wherein a mediated contemplation and guided re-evaluation can begin to happen, that is, the processes of plant succession and colonization made visible within 'the garden' are offered as metaphor to consider the struggle between natural and cultural processes, and of displaced peoples and communities.

In 1982, the year of Weinberger's first solo show, Agnes Dene reclaimed a bit of downtown New York site by planting two acres of wheat on it. This was a new way of thinking and prepared the ground (!) for Weinberger's later reclamation works.

Ten years later Weinberger created WILD CUBE, a stiff, formal geometry, an enclosure, (or a *human exclosure*), as a site for "spontaneous vegetation" growth. [5] Subsequent works involved

scarifying and breaking up the asphalt surfaces and letting pioneer plants (seeds) 'do their thing' and make visible the normally invisible.

Installations make use of practical, ready-to-hand, throw-away materials such as bottles, bags and plastic. This 'ready-made' aesthetic is contrasted with the sharper, more formal qualities of works such as *Untitled, 1998* and *Mobile Landscape, 2003* which carry a similar feel to the didactic works of Mark Dion's *Mobile Wilderness Unit – Wolf*, 2006 and also the works of Henrik Hakanssaon with which they are "...content to show... *fragments of natural cycles."*[4]

Inherent in the works are representations of and actual inclusions of organic materials. Weinberger's 2009 show in Bratislava, titled *Field Work* utilised a variety of leaves, saplings, earth, branches and bracket fungi.

In presenting artwork as beauty and in a poetic, rather than a scientifically-structured order, the work in the Gartenlust Belvedere, Vienna, requires the (repetition of the artist's) act of looking and becomes a small exploration and personal voyage of discovery, of form and colour and variety.

What is beyond the plants / is at one with them, 1997 is a work that used vigorous, neophytes to actively crowd out local weed species and involved a 100m section of railway track. The artist's intent was to use the botanical metaphor to create a dialogue around human migration. A more powerful work is **Burning and Walking** Broken asphalt / spontaneous vegetation, 1993 / 1997 which not only shows living processes and hints at what might happen when we have finished with this Earth but the up-thrust earth and plates of asphalt hints at the latent dynamic turbulence just under the seemingly unbreakable skin of human society.

In 2009 Lois & Franziksa Weinberger were invited to the Austrian Pavilion at the Venice Biennial. As part of their multi-media installation within the pavilion, they also created a work within a shed, titled *Laubreise* on which a text read "The decay of the heap is created by time/that makes it possible/to notice a small part of the large change...". The interior of the construction contained a huge, geometric heap of plant material, under ambient light though a blue plastic ceiling. This work involved the transformation of matter, of a never-ending, hidden change and disintegration of order made visible before us.

GARTEN (1994 / 2002) at the New Museum of Lower Austria both manifests change and implies the possibility of practical solutions and a sense of optimism for the future. The solutions-based, community-looking aesthetic of this work hints at a vision for how we will be thinking in the future. Crowding the space with brightly coloured plastic containers filled with soil and "the planting is left to the wind/the birds" [5] and the soil's own seed bank. The mobility of 'the garden' and its real potential pragmatic use for producing food and a green aesthetic within our industrialising society must never be underestimated.

Jessica Ullrich: Plants are both material and living things at the same time. They are symbols of process, dynamics, and change. As an artist, you are perhaps inspired by the dialogical aspect of working with plants. They are capable of forming networks or rhizomatic structures, and they are able to transgress boundaries. Do you think plants could serve as an example for human structures or a model for a new human being? What could we, as a species, learn from plants?

Lois Weinberger: A society's approach to plants is also a mirror image of itself. For me, a focus in the art realm on the wasteland, the periphery was necessary in the late 1980s. The botanical term "ruderal" (*rudis* = wild and artless)—I don't want to distort the world with art—seemed to me a promising metaphor in a debate that has recurred over and over around the subject of "art and nature."

Now twenty years later, I can see that "ruderal" has lost nothing of its contemporary relevance, and still retains the unsuspected power that I had wanted to dock into. Ultimately, I described my approach to nature around 1990 using the term "precise carelessness."

Bergit Arrends: The subject you explore in your work is the subject of "nature." Can you explain how you understand the term?

[LW]: Nature is always what we can imagine under that particular term, which is constantly changing and always culturally coded. It's not possible for us to translate the life of a plant to our own lives. Just as we approach nature, nature itself withdraws from us.

For me is important to differentiate between visible nature (greenery) and invisible nature, an inherent dynamic / the nature of the spirit, which we also construct by means of visible nature. The nature of the spirit as effect before cause.

Lois Weinberger
Green Man, 2004, c-print, 40 x 30 cm, edition: 5, photo: Paris Tsitsos © Lois Weinberger

It may well be that only our faith in nature keeps it going, just as the belief in rationality keeps technology and science alive.

[BA]: It could be argued that nature only exists as a cultural concept. In that sense, nature is often solely understood in terms of its metaphorical value. Would you agree with this?

[LW]: In 1994 I wrote texts that were published in 1997 as "Notes from the Hortus": "Into the time / yes it is true / nature does have time / in the repeated / in the repeating as a motto of coming into being / in the fun of the not having fun / nature lies in the repeated time." The aspect of time and dynamic leads to a more illuminative level.

The more we are able to "make" nature, the less we get part of it. The discourse about cultural concepts targets humanity's self-conception, as opposed the rest of the world: stones, chickens, ghosts, cars, or dragons.

As long as nature allows us to die, it's impossible to just see it as just metaphorical. I have been working in this realm—without a hedge—for the entire world to see, changing the soil, observing conditions, looking for what's usable. Is that not political and applied beauty, the map of the world as wasteland?

[BA]: How do you conceive of humanity's role in nature? What is your understanding of natural hierarchies, in regard to humanity in particular?

[LW]: Loving nature means taken to its ultimate consequence would require mankind's disappearance. The wrath against sandwort and stinging nettle is nourished by a premonition that they will be growing on our graves.

[JU]: Recently, scholars have been discussing the existence of agency in animals and even in things. Would you say that plants have agency?

[LW]: We still know extremely little about the life of animals and plants. I record their motion, their movements, let myself go, observe, discover, intervene, leave things alone and take other paths, branching out, in fact / curiosity as something that casts out / drives / branching out this way and no other / with no IFS or BUTS / beyond reason. Plants spoke in this (poetic) fashion. In some ancient cultures, it was said that in the beginning the stones spoke, all things wooden spoke, all plants spoke, all animals spoke—in the beginning, the soil spoke. But is it not the case that the more agency we grant to animals and plants the more we find ourselves in a state of cannibalism?

In the years to come, there will certainly be parameters that will expand and extend the being and life of plants. In addition, it could be beneficial for our situation of sharing the planet if we granted the plants a soul. In a 1992 exhibition featuring Austrian artists in Tielt, Belgium, my contribution was a plant transfer. I called the work *Brennen und Gehen* (Burn and Walk), and it referred to the two ruderal plants *Urtica* (burn/stinging nettle) and *Chenopodium* (walk/goosefoot). "Burning" or "stinging" as an anarchic dynamic and walking as a human quality—I engage with a plant / I charge it, whatever, to a respectable counterpart. Academic distinctions often generate immensely empty books. The free and unorthodox approach for me means expansion and a ray of hope.

[JU]: Sometimes you pick up on the traditional symbolic meaning of plants as remedies or as apotropaic signs. How would you characterize your own personal interest in plants? Is it their symbolic-semantic aspect, their aesthetic value, their historical-social coding, or some kind of biographically-rooted attachment that is most important to you, or are there other aspects?

[LW]: My work should be seen as a conglomerate with gaps and extensions. Fundamentally, I am interested in every kind of examination of plants or engagement with them. In 1988, I began to plant a ruderal area on the outskirts of Vienna that served as seed storage and distributor for unwanted plants, so-called weeds, underdogs. I studied open dumps, city wastelands, and the like, brought the plants to my area / had them multiply / to then in turn bring them to other places that were not marked as mine, where they disappeared. Plant transfers in the landscape realm as well as in urban space, in urban centers like Berlin, where I spent 1994–95 on a fellowship at Künstlerhaus Bethanien. There, on my research walks through the city my cartographic works emerged, maps of the city in which the streets, mostly named after heroic fighter names, were renamed after so-called weeds. The city puts aside the wastelands / just as they take over urban space.

My realm on the city outskirts of Vienna I have documented and stored loosely for eleven years from time to time, as a ruderal archive. A selection of 650 slides on a light table – a sculpture. There are 3 existing copies of the work in museum collections: one at SMAK in Ghent, one at Vienna's Belvedere, and one at the Arnolfini in Bristol.

[BA]: How far back can you trace your reference to the exploration of plants, the question of decorative and use plants in correlation with the history of economy, colonization, and scholarship? How germane are these to your work?

[LW]: The plant stands for the explosiveness of issues / from nutrition to the processes of migration in our time, for all systems surrounding us: this is a kind of thread running through all my work. I grew up surrounded by animals and plants, by the traditions and rituals of life on my parents' farm, and no doubt I was shaped by that experience. My father in particular was a major influence, and in spite of the daily hardships of working on the farm, he always took time to maintain herbaria of field plants. As far back as I can remember I was always drawing or collecting plants, counting the legs of beetles, boiling animal heads, etc.

If only for economic reasons, there was no other possibility for me to reflect upon my immediate surroundings. I felt that it was important to examine the village I lived in, to observe how nature and culture establish a symbiotic relationship. It was all relatively haphazard, and not so much driven by artistic ambition. I realize now that the foundations were all laid back then, and this foundation continues to be important still today. Art always stems from the provincial, and quality should be what determines whether or not it achieves international acclaim.

[JU]: You apply scientific as well as humanistic techniques and methodologies in your work. Do you consider yourself an artist/researcher?

[LW]: In the broadest sense, all art has to do with research, but all research also has to do with art.

Lois Weinberger
Tree Celebration, 1977, cherry tree, plastic bags, c-print, 67 x 79 cm, edition: 5, photo: Studio Weinberger © Lois Weinberger

For a long time, sober botanical or scientific treatises were a kind of prayer book for me.
Nature was never a topic of discussion on my parents' farm, even though everything revolved around it. We lived off it and from it. There were fields, meadows, cattle, the cold, the heat, the high pressures and the low pressures, the baling press and the blood poisoning—litanies, melodies and enumerations—in a word, repetitions.

I see myself as a fieldworker, I pick up things that are in the air; many of my works bear the title "Fieldwork." Like *Baumfest* (Tree Festival), or *Fliegenfänger* (Flycatcher) from the 1970s, to the *Home Voodoos* that emerged in recent years. As I said in 2004, "A chthonic procedure, emerging from the earth. Demonstrated are overlaps between reality and unreality. Whereby the meaning, for one, lies in overlapping and, for the

Lois Weinberger
Ruderal Enclosure WILD CUBE, 1991/ 1999 rib steel, spontaneous vegetation, 37 x 4 x 3. 70 meters, New Social and Economic University Innsbruck henke & schreieck architects, photo: Gerbert Weinberger © Lois Weinberger

other, in undermining the usual structures and opinions. A makeshift aid to revive memory, one that happily links socio-cultural aspects with individual needs—HOME VOODOO."

Or as Helmut Draxler put it in a 1982 exhibition catalog on the work *Baumfest*: "Weinberger circles around the lost familiarity with nature, the discrepancy that opens only closes in the act of celebration. He heightens the forces that it summons to a festival, the festival of the tree, the festival of growth, the renewal of the world." I saw the origin of the work in the more mundane: after flooding, the River Inn left behind colorful plastic trash in the bushes and trees lining the riverbanks.

From Michel Leiris' *The Ethnographer's Eye* to Hubert Fichte's *The House of the Mina in Sao Luiz de Maranhao*, ethnology, botany, and cultural studies have been decisive for my work, and for a long time I thought that theorists of nature and scientists were essential informants for my work. Now I see that somewhat differently, but they definitely left their mark on me. For me, philosophers often simply provide key terms that I use for my own difficult engagement in a work. As an artist, I don't feel dependent on philosophers and thinkers.

[BA]: Ever since the late nineteenth century, we have understood nature as ecology, and since the twentieth century we have seen nature in terms of biodiversity. We also look to nature to provide services for humankind. This is summed up and defined in the notion of "ecosystem services," an idea that has been around since about the 1970s. What is the role of ecology, economy, and human subjectivity (as defined by Guattari) in your view?

[LW]: Nature becomes more feasible, even if in small parts of that which is living, and there are many reasons for maintaining a critical attitude to the—in part cynical—conquests of the economy/science connection. As Gregory

Bateson put it, "Of all imaginary organisms—dragons, protomollusca, missing links, gods, demons, sea monsters, and so on— economic man is the dullest. He is dull because his mental processes are all quantitative and his preferences transitive." The notion of service in respect to nature highlights the totalitarian, economic view of anything and everything. How could a chicken only be imagined as a service provider?

[JU]: What is your opinion about the distinction *between nature and culture? Is this dualism obsolete in a world that is characterized by globalization, urbanization, climate change, and environmental pollution?*

[LW]: In the 1990s I once wrote: "Even if a river is swimming in oil residues, the so-called ecological balance is still there. After all, new life could still emerge from this vision of contamination." I am not a gardener, and my field has to be seen as an analysis and counterproposal to the prevailing consumerism.

Nature has nothing to do with general notions of purity, which is why I see art as constructions of everyday life, as suitable engines of life. Wherever the materials might come from: from a great-great-aunt on my mother's side, from a carver of tupilaq figurines, from the abolition of slavery . . . Concern for nature is based on the extraneous view that we living beings are in an inseparable relationship between nature and culture, as nature appears as the consequence of structural connections and is therefore always intact / concern for nature is directed at the way in which we approach ourselves and all that surrounds us.

[JU]: Your prefer the term "perfectly provisional area" for your interventions, yet nevertheless some of them are entitled "garden." Whereas the classical garden is informed by the idea of the hortus conclusus, the Garden of Eden, or other utopias, there are also more recent trends towards understanding gardens differently: for example as heterotopias (other-spaces), as elaborated by Michel Foucault, or in terms of Marc Augé's notion of the non-place. Can you relate to one of them in terms of your own understanding of a garden?

[LW]: Taking recourse to the unripe, the unfinished allows forces to shine forth that are otherwise devoured by the finished. The "perfectly provisional realm" is a term I developed in the early 1990s for my work. A perfectly provisional solution is a framework that just keeps from falling apart, but still works wonderfully, and doesn't cost anything, or something like that.

The garden for me was my mother's vegetable garden, I use the term garden more as a disturbance, as something that could not take place this way or elsewhere. I called my plantings areas from the very beginning; they are poetic locations that have reached a point where it's possible neither to speak of beginning nor of ending or stopping, a realm of possibilities that marks a point of intersection.

"A PLACE /
WHERE THE LIVING
SHOWS ITSELF
VISIBLY ABOVE
THE ORDERING
WHERE THE IMPOSSIBILITY
OF DESTRUCTION
BLOSSOMS AGAIN AND AGAIN
FROM ITS OPPOSITE
FROM IMAGINABLE CONSEQUENCES
OF THE NON-STERILE
INTO A DARING FUTURE

Fallow grounds / peripheral fields / gaps in the urban are places where boundaries show themselves as something in motion / something uncertain, gardens left to their own devices in all their variety correspond to today's necessity / the noticing of caesurae / connections and their repercussions / the garden as a symbol of voluntary renunciation / of tranquility of nonintervention. Space / created as a consequence of precise carelessness towards what we generally call nature / further and essential a work about the emerging and ceasing—towards our invisible nature."
I wrote this in the early 1990s.

[JU]: All your plantings leave traces that go beyond the duration of the exhibition. Your projects are not finite, neither in terms of space nor time. That makes them transitory, yet simultaneously promising. How important is the dimension of time for you, especially keeping in mind that most of your work is based on the search of traces, on collecting and archiving? Do you keep track of the developments that take place in your interventions in urban spaces?

[LW]: Only if they accidentally cross my path once more—as in St. Pölten. Eight years ago, I filled several thousand plastic buckets with soil

Lois Weinberger
Railway Track, neophytes from South-and South East Europe, 100 meters, documenta X, 1997, photo: Werner Maschmann © Lois Weinberger

from the fields, and let it be. The plastic buckets with metal handles, which are not intended for the outdoors, begin to disintegrate, become once more part of the earth from which they come. A reservoir of nature emerged that could have formed without my contribution. Or a different work: in 1991, a plan emerged for a ruderal-enclosure for which later the term WILD CUBE manifested itself—a monumental reinforced steel body 40 meters in length, in which reforesting takes place by way of spontaneous vegetation, without any human hand involved—RUDERAL SOCIETY, a gap in urban space.

This work was presented seven years later at the Neue Sozial-und Wirtschafts Universität in the center of the tourist town of Innsbruck and was initially the target of demonstrations: right wing populist politicians called it a eyesore, the largest and most expensive garbage pail in all of Austria.

But the work was not intended as a provocation, I had not counted on wild growth uncontrollability triggering such resistance and fear. In the meantime—the work has now existed for twelve years—it has become a research project of the Botanische Universität, and has been mentioned in numerous publications, accepted by the population and even defended; each change is registered and commented upon

by passersby.

[BA]: Do you solely work with plants and sculptural forms? Do you understand your work as investigating the role of plants in culture? What is your understanding of the invasion and migration of species (plant species), and do you equate it to human mobility?

[LW]: The occupation with the living being of the plant has an indicatory effect / into everyday life with its needs. After the 1970s, the first time the issue returned in a large scale fashion—the relation between art / nature/ urbanism / politics / sites / non-sites etc.—was at 'Documenta X' in 1997, and that triggered a boom that lasted until today, as could be seen at the subsequent documenta contributions that again dealt with the subject of the plant /garden.
At Documenta 1997, I planted a disused train track of 100 meters with neophytes from southern and southeastern Europe, which was intended as a metaphor for the migration processes of our time, with its poetic political references, was to point beyond it, and in this sense is still very present, as I notice in the unbroken interest in my own work.

[BA]: The ownership of land and land rights, especially if the land is used for agriculture, the spiritual value of land are often very contested and subject to conflicts. Do you take an activist role in such conflicts?

[LW]: I speak through my work, which seems explosive enough to me, and not as an organized activist. When there's a cage with wild growth standing there, a whole avalanche of controversial discussion breaks out. I do not create art as species protection, but my actions are effective in this sense. For me, it's about a paradigm shift from intervention to being there.

The need to be occupied with these issues—in the course of global economic development as well—is quite great and is reflected in art. I have seen this continuously since the start of the 1990s and with no end in sight, for the issues remain explosive.

[JU]: Would you agree that there is nowadays a new trend towards "green art" that is comparable to the one in the 1970s and than again in the 1990s when the topic was very present in the art world? How did nature involving art change over the last couple of years and what social changes might have contributed to this?

[LW]: I don't follow the latest art trends. It is true that the urgent issues of the day come through all sorts of channels of everyday life, they are simply in the air. One of these urgent issues for me in 1992/93 was to rip out a piece of the asphalt in the kitschy city center of Salzburg (8 meters by 8 meters in size), to enclose it and leave it alone after an initial planting.

In the fall, the work was removed and covered with asphalt again. In 1997, the work was once again installed on the parking lot of Kulturbahnhof, and in 1998 in Tokyo outside Watari Musuem of Contemporary Art.

[BA]: What other artists' works are important to you? What kind of art historical references do you make and what other artists' models do you refer to for an engagement with nature in its widest sense?

[LW]: Art historical references have never played a very important role for me in my work, except in my beginnings: there are works that I truly value, but I can't remember the details. The more I got into the work myself, the less I was interested in art history. I didn't attend an art school, and today I think that's a great strength, I worked for sixteen years in steel construction and at my parents farm, writing, making theater, films, drawing, etc. on the side. It was only in 1977 that I abandoned my profession and began working solely in the realm of art. It was already important to me to find conceptual approaches in the realm of a contemporary debate on nature—thinking through everything myself, working it out, formulating it. In the late 1980s, the wastelands / the ruderal societies seemed to me an adequate metaphor of a way for engaging with the subject of nature and art that was fitting for the time. The increasing planning of our surroundings, as well as economic development, have not and do not allow for any free spaces.

[JU]: You represented Austria at the Venice Biennale. The Biennale in general has been criticized for being an outdated display of national pride.

[LW]: As a participant artist, of course the national pressure is palpable. The greatest interest is not in the art, but in the boost in cultural tourism before the backdrop of the city of Venice. There have repeatedly been attempts to dissolve the country

Lois Weinberger
Laubreise, Austrian Pavillon Venice Biennial 2009, heap of rotting plants, 350 x 250 x 170 cm, architecture: wood, color, blue plastic tarp, 500 x 400 x 420 cm, photo: Herta Hurnaus © Lois Weinberger

pavilions, but it's not possible for me to see myself as the representative of a certain country.

[BA]: The two of you haven't always worked together, but now have been collaborating on projects in public space since 2003. Why is this and do you only work together on projects in the public realm?

[LW]: Franziska's point of view and my discussions with her are important, and so they shape my work. In addition, my wife deals with all issues of public relevance, and for some projects in the open air we use both our names, for example the open-air project at the Venice Biennale.

[JU]: How important is site-specificity to you? Is it possible to transfer works like the Transportable Gardens *without any adaptation into another context or is the resulting shift of meaning rather undesirable for you? Do you approach commissioned works in a different way than the projects that you develop without any specific commission?*

[LW]: Art makes the space / the immigrant bags (portable gardens) of WILD CUBE or the ripped out asphalt are possible in all sorts of surroundings / in the urban space (large city, small town, village) as well as in the open space of a rural area. The change in meaning is an inherent part of the work. When the planted bags are placed at the entry to the exhibition hall at the Gyumri Biennale in Armenia, the fields of association that result are quite different than those that emerge before Toyota Museum in Toyota City, Japan or at the *Liverpool Biennial.*

[JU]: To what extent do you consider animals part of your work? I'm not so much thinking of the animals that obviously surface in some projects—like the spruce engraver, the colored hens, or dead flies—but the insects and birds that use your work and co-construct it in some ways.

[LW]: *A WILD CUBE* in a city is immediately inhabited by animals, those who anyway are responsible for planting, along with the wind and the seeds found in the soil.

Lois Weinberger
Portable Garden, 2004, Immigration bags, earth, spontaneous vegetation, dimensions variable, exhibition view: Hortus and Botany, Liverpool Biennial, photo: Angie Konstantinidou © Lois Weinberger

The video *Datura stramonium* shows the destruction of a dried up thorn apple in the condition of animalization (as if this were possible). I felt up the plant with the camera running, more or less violently, breaking leaves and branches, in the closest approach to the plant, destruction, like a wild animal, to whom we attribute arbitrariness and boredom.

[JU]: Your style of writing seems to have the same rampant quality as your plantings. What role does the written word play in your oeuvre? Are your texts independent bodies of work or do you consider them more as mental preparations or follow-ups of your more haptic installations?

[LW]: Using the associative flow, provisional text constructions emerge. I see these interweavings and transports as a poetic, political act—why not poetic politics / when poetry is understood as branching out between many layers, as condensing, that it is still possible to drive out. This way of writing is very liberating and is linked to Sigmund Freud's technique of "free association." This was also the title of an exhibition to which Tom Trevor and Zoe Shearman invited me in 2000 at Freud Museum in London, on the occasion of ceremonies for the one hundredth anniversary of the publication of *Interpretation of Dreams.*

[JU]: You once said that a good gardener should abandon his garden. What exactly do you mean by this?

[LW]: On top of that, I think that in the paradox the values can be found beneath the surface. Being involved with nature and not being a garden artist: for me that's a good state of affairs. Maybe the actual garden can be found beneath / in the soil / one descends into it / only in so doing is it perceived—and above, partial results and remains. Fine that way, down and out.

[JU]: What have been some recent projects, and what are you planning to work on in future?

[LW]: New projects for next year include

Lois Weinberger
Datura stramonium, 1996, video film, 7 min. exhibition view: Arnolfini Bristol, photo: John Melville © Lois Weinberger

comprehensive individual exhibitions at Watari Museum of Contemporary Art in Tokyo and Musée d'Art Moderne Saint Etienne, and exhibition project of Frankfurt's Städelmuseum at Villa Schöningen in Potsdam as well as an artist book that will appear with *Captures Èditions* in France and which I am especially pleased about, a large *WILD CUBE* will be installed next year at Stiftung Braunschweigischer Kulturbesitz next year.

My concept foresees that this work is permanently installed in different locations in the urban as well as the landscape space. There are now two, and I hope a few more will come. London would be a great place for a *WILD CUBE*.

References

1. Pringle, L. (1979) Natural Fire: Its Ecology in Forests. William Morrow and Company, New York. 27-29.

2. Ford, L. (2009) How to Feed the World in 2050 Food and Agriculture Organisation of the United Nations, Guardian Website, Mon 12th October 2009.

3. Arnolfini (2007) Introduction to the exhibition: Lois & Franziska Weinberger – Home Voodoo (leaflet)

4. Miki, A. (2006) The Clearing In: Henrik Hakansson THROUGH THE WOODS TO FIND THE FOREST,

5. Weinberger, L. (2010) www.loisweinberger.net

Born in Stams/Tyrol in 1947, lives and works in Vienna.
After working as a locksmith and wrought-iron craftsman, the artist was professor at the Karlsruhe Academy from 1994 to 1995, giving numerous lectures in Austria and abroad in 1996–2004. Lois Weinberger assumes a particularly individual position in Austrian sculpture. He operates at the interface between art and nature, nature and sculpture, and art and life, fighting above all against the concept of beauty with subtle anarchic means. In his rural environment he created art works in the mid-70s using civilisation waste such as plastic bags by mounting them on trees. As of 1979, Weinberger began making sculptures of wood and different materials. The renowned artist has received numerous prizes, for example, in 1998, the Prize of the City of Vienna, in 1999 the Art Scholarship of Tyrol Province and, in 2005, the Achievement Prize of the Federal Chancellery. Lois Weinberger's works have been on show internationally, including at Vienna Secession in 1984, at the Municipal Art Gallery in Los Angeles in 1985, and at the Biennale in São Paolo in 1991. In 1997 the artist featured at the "documenta" in Kassel, in 2000 at the Camden Arts Centre in London, and in 2001 at the Sculpture Biennial in Münsterland. Since 2003 the artist has been working for art projects in public space together with his wife Franziska Weinberger.

THE LOST FOREST

Susan Purdy's photograms denounce the disappearance of the Gippsland forest which is still being ferociously logged. The darkness of the photograms provide an ideal medium for addressing what is lost and gone, in this case an entire landscape.
Interview questions by Giovanni Aloi

Susan Purdy
The Lost Forest, gelatin silver photogram © Susan Purdy

The Gippsland forest was once so tall and dense that even travellers in daylight found it necessary to carry lanterns when passing through. No settlers could live there and local aboriginal people hunting for lyrebird feathers in the forest, preferred to camp on its edges. It was dark and dripping wet and alive with creatures like tiger snakes and powerful owls.

Although less than 1% of this forest exists today it is still being logged voraciously. Gippsland's natural resources have been systematically exploited over the last century. A witness to poor forest management and the inevitable decline in biodiversity I have cultivated an intense observation of this landscape and a deep reflection on its transience. Today it is mostly grassland edged by dark soughing pines, where industrial scale wind farms are planned in the emptiness left behind the cleared forests. Recent understanding of climate change reveals the act of removing the trees on this scale as a kind of madness.

The darkness of the photogram, and the elegiac quality that objects acquire with this technique, provides an ideal medium for addressing what is lost and gone, in this case an entire landscape. The fragility of 600 pinned matt prints in the exhibition will echo the easy destruction of their subject.

Printed colonial remnants, belongings of the first settlers including tools and simple domestic items are transformed by this process. The precise dimensions of a crosscut saw rendered in this way provides an experience of great directness through its printed shadow. The viewer is are able to measure their own arm against the very same grim teeth that enabled a pair of men to fell a forest, tree by tree.

The work will include funereal wreaths of clematis and wonga vine, terrestrial orchids, and underneath these the form of the giant Gippsland earthworm will push slowly between roots and through an imaginary geology of gray, red and black soils, to the edges of the coal fields. Here the blackness of the photopaper will evoke the oldest darkest soil; compressed rainforest, become a hardened and shiny layer that can be broken out of the earth in carbon chunks that burn. The darkness of the installation endows a fitting sombre eloquence to this keening and lament for the changing of this land.

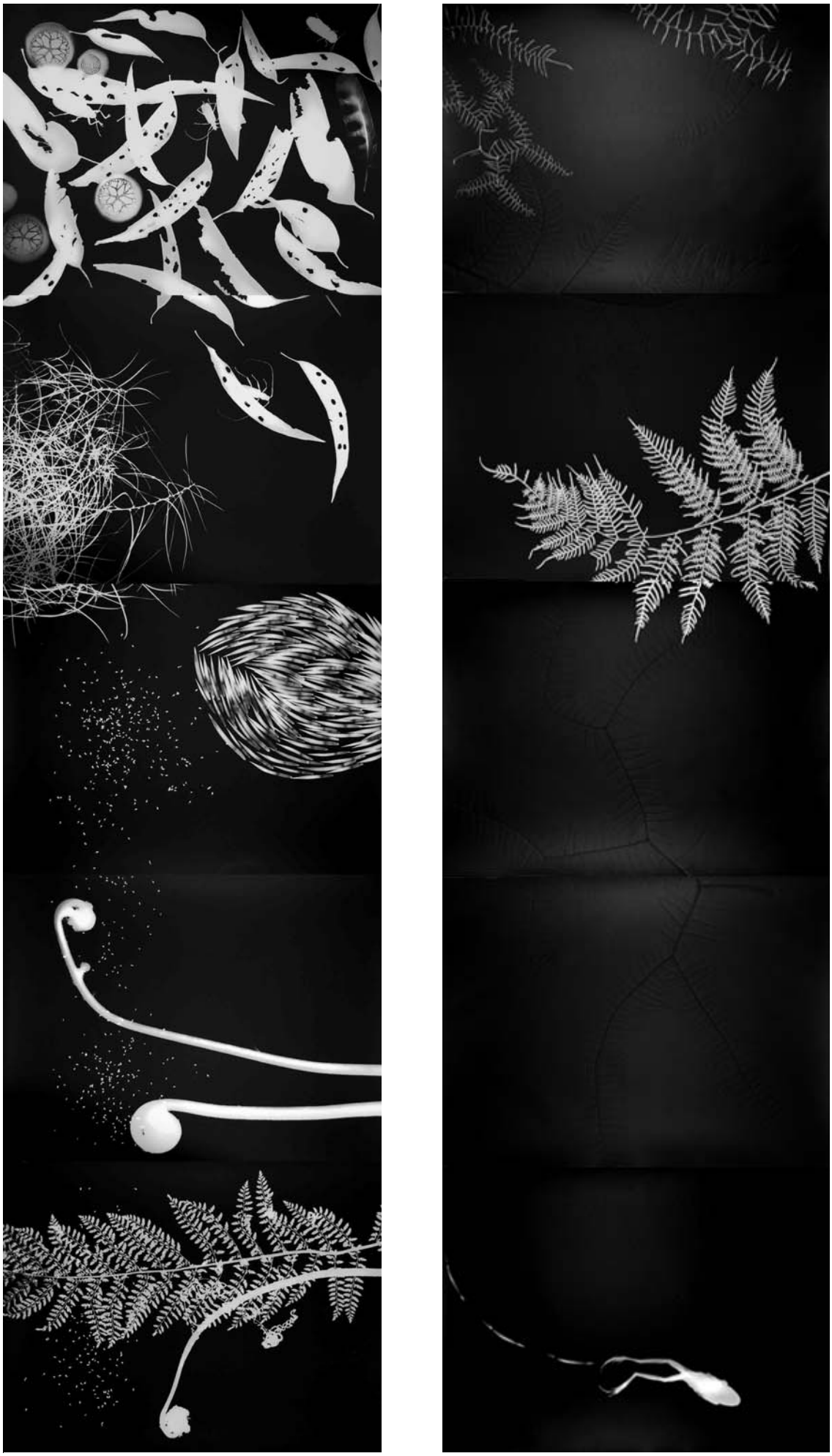
The long sequence of individual photograms (30 X 40 cm) made for **the lost forest** will be constructed as a coherant narrative surrounding the viewer to give them a direct and physical impression of the mighty scale of the forest.

The viewer steps into darkness within which the photograms suggest a kind of X-ray vision activating the viewers perception that the space has (an illusory) depth and that the walls have receeded. In this way the work I propose to make will resemble a container of lost beauty and represent a portal through which one might step back into the forest of an earlier time .

Because the objects must lie on the photographic paper in the process of recording of their form, the connection to the environment is viscerally retained. A tawny frogmouth skull or the shed skin of a tiger snake, trace the archaeology of an old forest. Utilised this way colonial remnants, belongings of the first settlers including tools and simple domestic items, are transformed into spooks and unquiet spirits.

I have collected a comprehensive range of wet photographic processes and printmaking techniques in the development of a unique visual language with which to conjure this narrative; In addition to printing photograms on the photographic paper, I can emboss it with plant materials with a pass through the printmakers press, I can draw on it, stamp it, stencil it or selectively dodge areas of the light sensitive paper. In the context of this project dodging is a particularly effective technique to employ in building layers of meaning. With it I can evoke the ethereality of smoke, gas, vapour, dust clouds and the blast of the wild South Westerly wind which now whistles between bald and careworn hills.

Susan Purdy received her MA in Fine Art from Monash University in 1996. Since then she has held several solo and group exhibitions around Australia. She has been awarded four development grants for her work including a three month residency at the Australia Council Studio in Taiwan in 2001 and a grant by Arts Victoria in 2002 which resulted in an unique collaboration between Purdy and Terry Smyth, the curator of plants in the Southern Chinese Collection at the Royal Botanic Gardens Melbourne. Her most recent solo exhibition "New Branches on an Old Tree" was formulated through this collaboration. Purdy's work has been collected by private and public institutions and is among recent acquisitions of the National Gallery of Victoria and the National Gallery of Australia. Susan Purdy currently lectures at Monash University.



Susan Purdy
The Lost Forest, gelatin silver photogram © Susan Purdy

PHYTOPHOBIA AUSTRALIS

Phytophobia australis *is a dialogue between two Australian artists, Caroline Durré and Susan Purdy. In this exchange they explore the historical confrontation between European settlers and the Australian flora. As an immigrant people Australians have not been reconciled to the given vegetation of their continent; they have been driven by an implacable desire to remake the land, to force it to conform to an unattainable ideal.* Phytophobia australis, *a collage of documents, mirrors the patchwork state of remnant indigenous vegetation, and investigates the inability of a people to be reconciled to their land.*
In conversation between Caroline Durré *and* Susan Purdy

Caroline Durré: Misrecognition, distaste and violence epitomize the earliest European encounters with the plants of Australia. From the journal of Sir Joseph Banks, botanist on Captain Cook's first voyage of exploration, 1768 –1771:

a kind of Beans, very bad
one kind of Grass… its sharp seeds were bearded backwards and whenever they stuck
into our cloths were by these beards pushed forward till they got into the flesh
a plant… calld Coccos in the West Indies; on tryal however the roots were found to be too acrid to be eat
a fruit we calld Plumbs [and] another much like a damson both so full of a large stone that eating them was but an unprofitable business
a kind of fruit resembling a Pine apple very much in appearance, tho in taste disagreable enough
trees… all of a very hard nature; our carpenters who cut them down for fire wood complaind much that their tools were damagd by them
the fruits of a low Palm… so unwholesome that some of our people who… eat one or 2 of them were violently affected both upwards and downwards
a kind of Wild Plantain whose fruit was so full of stones that it was scarce eatable
other usefull plants we saw none

The greatest botanist of his age does not express a word of delight in this, the first scientific encounter with an unknown, rich, and beautiful flora.

* * *

Susan Purdy: Seventeen years later, in 1787, the First Fleet set out for Australia to establish at military and convict settlement at Botany Bay. This is the list of plant-based provisions that were included: *20 Bushels of Seed Barley; 10 Bushels of India Seed Corn; 60 Bushels of Seed Wheat; 12 Baskets of Garden Seed; Fig Trees; Quinces; Apples; Pears; Lemon; Orange; Strawberries; Oak and Myrtle Trees; Banana; Prickly Pear; Cocoa; Coffee; Cotton; Guava; Tamarind; Bamboos; Sugar Cane.* [1] They also carried eugenia *(Eugenia uniflora)* the Surinam cherry, native to Brazil, a small tree with a conical form and glossy green leaves, whose fragrant white flowers mature into reddish fruits high in Vitamin C; ipecacuanha *(Psychotria ipecacuanha)* a species of flowering plant in the madder family, native to Brazil, with a long history of use as an emetic, for emptying the stomach in cases of poisoning; and Spanish reed *(Arundo donax)* cultivated throughout Asia, southern Europe, northern Africa, and the Middle East. The durable canes of Spanish reed contain silica, and have been used to make fishing rods, walking sticks, paper, reeds for woodwind instruments such as the oboe, bassoon, clarinet, saxophone, and the chanter and drone reeds of bagpipes.

These last items are evidence of observant, wide-ranging plant collecting. How is it that they could not recognize the potential in what they found in Australia?

* * *

[CD] In the late eighteenth and the early nineteenth century European explorers mapped coastal and inland Australia. Coupled with this geographic investigation was an imperialism of seeds. In 1792, at Recherche Bay in South East Tasmania, on Bruny d'Entrecasteaux's expedition, Félix Delahaye made a garden and 'sowed… celery, chervil, chicory, cabbages, grey romaine lettuce (etc)… [and] mixed seeds everywhere thrown at random, where [he] believed they could succeed.' (trans. Maryse Duyker). [2]

In 1817, on John Oxley's expedition to the Lachlan and Macquarie rivers, he 'planted acorns, peach and apricot-stones, and quince-seeds, with the hope rather than the expectation that they would grow.' In 1824, Hume and Hovell sowed 'some clover seed, and a few peach stones, a practice they had observed at every place at which they had stopped.' In 1844 in the far north-west corner of New South Wales, Charles Sturt 'prepare[d] some ground for a garden, with a view to planting it out with vegetables— pumpkins and melons.' [3]

In a form of symbolic rape, expressed as the forceful insemination of the Australian seedbed, explorers set in train the pattern of compelling the land to receive introduced plants, a land that over 99 million years of geographic isolation had evolved 20,000 endemic plant species.

* * *

[SP] Cultures clash – and the landscape changes. A foreign horticulture, imposed into old soils with marginal fertility, set up a competition between two systems, now jostling and crowding for light, space, and position. Native flora and fauna presented a challenge that had to be controlled, alongside a parallel psychological imperative to cultivate and grow on that bright red geranium cutting, carried all the way from the homeland.

The exotic plants included in the First Fleet's provisions are evidence that a transaction of knowledge about plant food sources had taken place on other foreign shores. At the very least the list suggests a relationship of learning and exchange about what was edible developed with Brazil. In Australia, however, it seems that the European's alienation in the new world was so comprehensive that it blinded them to the sustainability of the aboriginal interaction with the environment, and to the intelligence of the native people's diet. Instead their imaginations conspired to perceive an abject and uncivilised people with nothing to teach. Australia's early white settlers set about using Latin classification and botanical illustration, to study, catalogue and order knowledge, as they acquired it, of the plants and animals of this new world, while teeming, unfamiliar creatures invaded their gardens.

* * *

[CD] By the mid-nineteenth century Australia was immersed in international networks of botanical exchange. The colonists were vigorous acclimatisers, hoping to remedy the perceived deficiencies of Australia, its failure to conform to recognised patterns of the beautiful and the picturesque. They imagined transforming the land into a familiar and productive place, their agents being animals and plants that would thrive independent of human cultivation. These were indiscriminately released on the predator-free landscape.

Thus, by 1925, prickly pear (*Opuntia spp.*) was completely out of control, infesting some 25 million hectares in New South Wales and Queensland. The spiteful tangles of blackberry now overrun 8.8 million hectares of bush and cleared land, with a particular predilection for choking the banks of watercourses. Lantana, a weed toxic to stock and poisonous to native vegetation, blankets over 4 million hectares of pasture and many millions of hectares of forest with its impenetrable thickets.

There are around 2500 weed species in Australia. Plant material is now subject to quarantine, but the logic of acclimatisation is still in play with each garden plant that escapes to become an environmental weed, every grassland sown with 'improved' pasture grass, each hectare of native forest cleared for *Pinus radiata*.

* * *

[SP] 'The axe, fire, tillage, grazing animals, rabbit pest, noxious weed, vandal and expanding settlement (all concomitant with white men) have had a profoundly destructive effect upon the original flora,' wrote J.H. Willis, botanist, National Herbarium of Melbourne in his 1950s introduction to *The Wildflowers of Victoria* by Jean Galbraith, the purpose of which was 'to afford Victorians an up-to-date guide, in plain language, to many representatives of their 2,200 different wildflowers.'

He continued that 'without laboring the aesthetic point of view, which no intelligent person would deny, we are bound to consider the natural vegetation in any country from at least two other aspects, viz., economic and scientific. Forestry

Departments are basically concerned with the products of plant life – timber and paper, charcoal, essential oils, honey, resin etc – but it is axiomatic that replacements must keep pace with utilization, so that the forest crop becomes an enduring asset… from a purely scientific standpoint, we have many of the most interesting plant species living in the world. Eminent scholars have journeyed overseas to observe our insectivorous bladderworts and sundews, our gigantic mountain-ash eucalypts or the geologically ancient grass-trees.' [4]

Movement across the globe of people and vegetation has been both enforced and deliberate. Jean Galbraith listed the relocated bush plants in her family garden, noting that 'dozens of plants have been added since the border was made. Bauera, thryptomene, leafless bitter pea, with its red-brown flowers, came from the Grampians, cassia from the Mallee, fringe-myrtle from the hills of north-eastern Victoria. By many ways our plants have come.'[5]

* * *

[CD] Moisture, tenderness, abundance, fertility; these are garden ideals that we brought to this continent. Plants of cool moist climates – azalea, silver birch, primrose, tulip – represented this ideal to people struggling in a strange land. Every summer, desiccating winds from the desert have consumed their hopes. Thomas Lang (1815 – 1896), a nurseryman in colonial Victoria, raised 10,000 seedlings of Norway spruce in 1859. Only a single one survived the hot winds of summer. Then, despite precautions of shade awnings and extra water, the same fate befell his thousands of seedlings of European larch. [6] One hundred years later the lesson has yet to be learnt. In *The Road from Coorain* (1992) Jill Ker Conway recounts how her mother struggled to create a European-style garden in marginal pastoral country in central New South Wales. During a drought that lasted for seven years her mother's tender northern hemisphere plants were relentlessly scorched by hot winds. [7] This tortured garden came to symbolise hatred and despair, in a land that refused to nurture the living things that carried so much symbolic meaning.

The hot wind blows ever outwards, from the scorching centre to the temperate coasts. From colonial days to the present in Australia, the wind from the desert has withered our dreams of an earthly green paradise.

* * *

Departments are basically concerned with the

[SP] Meanwhile, the antipodean version of an earthly green paradise was flourishing unseen in the majestic mountain ash wet forest, and the gullies of ancient cool temperate rainforest, along the south-eastern edge of the continent. This 'flora of the cool temperate rainforest is predominantly comprised of blackwoods, sassafras, myrtle beech, hazel, musk, silver wattle, pittosporum, dogwood, treeferns, climbers, mosses and fungi.' [8]

Rainforest follows gullies and co-exists with the wet sclerophyll (tough leaf) forest on the slopes dominated by the mountain ash (*Eucalyptus regnans*), the world's tallest flowering plant, which reaches heights of more than 100 metres and lives for three or four hundred years. These majestic straight-trunked trees 'draw moisture directly from clouds, (as well as from the earth), and create an atmosphere of perpetual damp.'

Scientists have identified mountain ash forests over 100 years old to be the most effectively carbon dense in the world, storing and locking up to 1900 tonnes per hectare. The cool dark environment ensures that bushfire rarely occurs. But when droughts do come about and the forest dries out, it becomes highly combustible. Julie Constable and Kim Devenish make the observation that 'as an individual, a mountain ash tree is fire sensitive, as a forest it is fire dependent.' [9]

The bushfire kills mountain ash, and yet the event is essential to the next generation of trees. Only in the aftermath of wildfire does the seed germinate and grow. The trees grow in pure, even-aged stands, which date back to the last big fire. Wherever mountain ash forest exists, there will be a history of bushfire.

* * *

[CD] Where indigenous people had burned frequently with low intensity, settlers prevented fires. Fire suppression lead to less frequent but more intense fires. In some of the most inflammable vegetation in the world, such fires are terrifying events of explosive flames, choking heat, smoke that blacks out the sun – regular summer happenings in south-east Australia.

As early as 1851, 5 million hectares (12 million acres), still the largest area on record in Australia, were burnt. In 1983 75 people died in fires in Victoria and South Australia. In 2009, 173 people, many in towns not far removed from urban centres, died in bushfires of horrifying intensity.

Caroline Durre' / Susan Purdy
Phitophobia australis, gelatin silver photogram, 91.2 x 40.5

After each of these summer catastrophes the Australian vegetation is identified as a visible cause of such trauma. After the 2009 fires, changed regulations allow property owners on bush blocks to remove all vegetation around their home, including trees, within 10 metres of the house, and all vegetation (except trees) within 30 metres, without the clearing permit, intended to preserve remnant bush, that was previously required. Thus every dwelling can occupy a cleared area of 0.36 hectares (0.89 acres), further fragmenting habitats and diminishing the remaining forest.

The hatred and fear of Australian plants, evident since the earliest days of European exploration, is still at work to reconfigure the landscape.

* * *

[SP] Australia has suffered the biggest decline in biodiversity of all countries over the last 200 years, largely due to agricultural clearing and introduced species such as foxes and cats.[10] There is a paucity of data on the extent of pre-European forest and woodland cover except for mainly anecdotal details for small areas.

Patrick Morgan, looking back over the loss of the southern forests, argues that it was a work of increments, since 'selectors had not intended to destroy the whole forest. They were unable to generalize from their own experience. They thought only in terms of their own block, parts of which they cleared, but even then they were still surrounded by bush on four sides. One day, decades later, they looked up and their bush was all gone, and so was their neighbour's. They could now see outside their property, sometimes as far as the sea. They were shocked to find that inadvertently most of the wonderful mountain forest of south Gippsland had been destroyed… the selector's gain had a corresponding loss.'

Morgan observes that this destruction was driven by contingency. There was no grand plan, so that 'as a rule the farmers themselves didn't question the cutting down and burning of the trees on their block – they had to make a livelihood… Some of the local women poets lamented the loss of the forests, although they balanced this with a celebration of the new homesteads that were arising. Two opposing themes run through their writing: the grandeur of the trees and the brave incessant toil of the pioneers in cutting them down. Both were heroic entities, but they were in competition with each other, the essence of tragedy.'

This lack of the larger vision has driven the tragedy of the Australian landscape. Even though indigenous plants are now being integrated into private gardens and public landscape design, powerful cultural filters have caused the Australian flora to be treated with fear and hatred, disdain and eradication.

Dr Caroline Durré is an artist, writer and lecturer in the Faculty of Art & Design, Monash University, Melbourne, Australia. Her solo exhibition The poetics of geometry (2010) was shown at Latrobe Regional Gallery, Morwell, Victoria. Her website is http://carolinedurre.com. Susan Purdy is a photomedia artist who lectures in photomedia in the Gippsland Centre for Art & Design, Monash University. Her most recent exhibition was Australia Phoenix: a cosmology at TarraWarra Museum of Art. Her website is http://susanpurdy.net.

BEYOND GARDENS

Michela Pasquali, landscape architect, editor of the Oltre i Giardini (Beyond Gardens) series of books takes through an eye opening walk through the challenges faced by gardeners and designers working with the urban environment.
Text by Michela Pasquali

Since 2008 I have been the Editor in Chief of the Bollati Boringhiri series *Oltre I Giardini (Beyond Gardens)*. The series came to life because of the insightful approach of the then director Francesco Cataluccio who foresaw, well before many others, the importance that thematic discussed in the series would have acquired in the near future. The series was developed over the past few years with the intent of discovering and problematizing the specific connections between landscape and thinking, garden and art, nature and culture. Through the contribution of scholars from wide ranging disciplines, the series tries to piece together a vision of our botanical surroundings, one that is much wider and complex than previously thought in order to provide readers with a vision that adequately reflects and incorporates the challenges posed by contemporary knowledge formation

The result is a new collection of books, by nature explorative and open; one that not only offers finalised results of research but that also aims at mapping new territories of enquiry through the use of new tools appropriately crafted for the dissection of a subject in constant becoming. A project of many projects, a web of heterogeneous knowledge pivotal to the experimentation and innovation, the series incorporates different perspectives without shying from disagreement and confrontation – a relevant feature of true discussion.

Oltre I Giardini aims therefore at addressing a new and increasingly widespread sensibility concerned with manmade landscape and its uncertain ecological destiny. At the same time the series proposes the opportunity to think of landscape as an identity-forming agent, attempting to understand the drives and historical backgrounds of all aspects that day after day fade and disappear, living us feeling deterritorialised.

Over the past few years, my attention has focused on biodiversity, heterogeneity and temporality in relation to the urban space and connected to a new ecology that keeps into consideration the accountability for the limited availability of natural resources. We live in an urbanised world in which the whole planet is subjugated to the urban-industrial system and in which every day vegetal and animal species are lost along with the ability of the earth to regenerate resources. All this may be reduced to issues of cultural aesthetics but despite the apparent independency of technology from nature we are still dependent on the biosphere, on its cycles and on its regenerative systems.

These themes were brought to surface by the environmentalist movement of the 1960s in order to denounce the effects of human interactions with environments: forests were dramatically reducing in size, deserts were expanding, agricultural grounds become poorer in nutrients, the ozone layer became thinner and thinner and the number of vegetal and animal species on the plant began dwindling. It is through the acknowledgment of these events that a new vision of nature that recognizes the complex

Field Operations and architects Diller Scofidio + Renfro
The Highline, New York, 2011 (work in progress area) © Giovanni Aloi

relationship between all living beings emerged. One of the many manifestations of this newly acquired awareness is the birth of a new form of urban green initially originating from the United States and subsequently reaching Europe. Anonymous neighbourhoods, dead spaces of urban landscape and no-man lands have been radically transformed by "urban pioneers" who have colonized new territories to invent and promote new gardens designed to involve the local communities in order to improve the existing precarious social realities in place. [1]

Creativity, the use of poor recycled materials, the implementation of hardy, local plants combined with ornamental varieties have contributed to the development of more integrated natural elements in the urban space, leading to the development of a re-evaluation of the public space in the city as a privileged scenery. It is in this climax that we find the birth of this new kind of urban garden, one that plays a key cultural and social role as cohesive spaces lived, built and used by citizens in active ways. But beyond the spontaneous movement of individuals that are interested in urban-green, for over twenty years, a new body of knowledge that binds the practice of urban gardening to the theory of garden, its biodiversity and ecology has found increasing support of landscape designers, artists and architects on both, professional and academic levels.

Today, after the best part of forty years, this idea of nature in the city continued to develop and expand following the path of those first revolutionary examples and reaches new territories thanks to the development of new forms of communication; every initiative or emerging group has a blog or website that supports the sharing of communal aims. The creation of a dynamic environment in which animals and plants are integrated, the fostering of biodiversity in order to grant a sense of identity to local areas, sustainability are all part of a trend that counts amongst its protagonists Gilles Clement e Bernard Lassus or young landscape designers like Coloco or the Atelier le Balto which ground their practice on participation and temporality. In the age of global warming, architects, artists and scientists are challenged to find more and more complex solutions in order to create true and independent microcosms.

One of the most visible examples is the new *High Line* hanging park born from the transformation of the disused railway network in Manhattan. This regeneration project has implemented in its final design the very plants which spontaneously grew amongst the abandon tracks and which originally suggested the idea for

Field Operations and architects Diller Scofidio + Renfro
The Highline, New York, 2011 (work in progress area) © Giovanni Aloi

a new kind of park. Well before major Michel Bloomer came up with the idea, spontaneous vegetation had deformed tracks and cracked concrete reclaiming the space. This great project, today a major success was originally developed by the inhabitants of the area who gathered in an association that today plays a key role in the environmental, social and mediatic life of the neighborhood. However, the reappropriation of urban spaces does not exclusively revolve around the re-invention of monumental spaces. Much smaller projects with limited budgets can profoundly transform the ways in which green is integrated in the city. In many countries, especially in central and northern Europe, governments have increased the levels of support to regeneration projects involving the establishment of new green areas. The high number of dead spaces in cities and the fact that public spaces have more and more being defined by the circulation and parking spaces of car have contributed to the creation of an increasingly complex reality for many cities. Today, abandoned urban areas are seen as an opportunity for re-shaping the current conception of the public urban space through the reduction of the impact of new built realities.

Patrick Blanc, a botanist and inventor of a new system for the creation of the famous vertical gardens, also is the author of *Il Bello di Essere Pianta (The Beauty of Being Plant)*[2], one of the book published as part of the series *Oltre I Giardini*. In this small book, Blanc vocalizes the story of the life of a Sonerilia, a small plant found in the undergrowth of the tropical forest from in which it observes how "without realizing, man brings plants to reproduce his system of interests where greed and expansionism quantifying in the increased production of carbon dioxide also supports the development and expansionism of plants. The erosion of their cultural diversity is there fore translated in an erosion of biodiversity". Following de Blanc's text it seems clear that the importance of preserving vegetal endemism and biodiversities which constitute a heritage of extremely high level, a heritage that demands to be preserved in nurseries in which species of interest can be cultivated in order to minimize risks of extinction and genetic mutation.

A number of recent studies [3] on biodiversity have shown how even in the urban context a large number of endemic plants live and happily multiply, at times their exuberance exceeds that of rural environments. The city becomes therefore a new and suitable home for rural plants, some rare ones too, that prosper in the urban environ, on that would be discounted as hostile. All forgotten places like cracks in walls and roofs that we neglect are reclaimed by plants. In 1855 a census revealed that in the ruin of the Coliseum found home over four hundred species of plants.

Heterogeneity and biodiversity is also a key theme in the work of Diana Balmori an important landscape designer based in New York who also has written for the series *Oltre I Giardini* [4] focusing on projects revolving around the reclaiming of rivers over the past ten years. This book gave the opportunity to introduce eight principles at the core of the new conceptual approach urban landscaping. These are: interconnectedness; reintroduction of heterogeneity; dissolution of geographical boundaries; exposure to nature's elements against isolation; re-invention of ecological forms; interconnectedness of urban life in natural processes; meditation o on urban politics in civil engineering; aesthetic considerations and representation of projects.

This approach in the fields of architecture of landscape on large scale, but applicable even to small scale projects, is born out of a sense of urgency that dominates the city and from the necessity of planning in new ways in order to favour life, not only our own, but also that of plants, insects, amphibians, birds and mammals, to preserve flora and fauna and to take care of water and air with more respect avoiding further pollution and attempting instead to cleanse what has so far been compromised. This constitutes a challenge demanding an abrupt change of direction from the objectives perused over the last two hundred years.

With regards to heterogeneity and biodiversity, Balmori writes: " Why heterogeneity? Try taking a stroll on Ocean Avenue in the small village of Sconset, in Nantucket and you will discover why heterogeneity is so important. On one side of the road you will see some cottages made of wood which terraces overlooking the sea. The road, on this side, is bordered by bushes and lawns, all perfectly trimmed these only count one, two, or a maximum of three different species of grass. On the other side is the cliff with its beach just underneath surrounded by a wide band of different plants. Some were maybe planted by someone on purpose, like the roses; others may have escaped from nearby gardens, like the autumnal clematis. Then there are some plants that like to be on the side of cliff the poisonous ivy. On this side of the road and in the small space of three blocks it is possible to collect without much effort at least fifteen different varieties of wild flowers like *Barbarea vulgaris*, *Hieracium pilosella*, *Solidago sempervirens*, *Oenothera biennis*, *Verbascum thapsus*, *Achillea millefolium*, *Erigeron*

annuus, *Eurybia divaricata*, *Polygonella articulata*, *Daucus carota*, *Lychnis alba*, *Phytolacca americana*, *Cichorium intybus*, *Trifolium pretense*, *Rosa rugosa*, and a large number of grasses and the larger bushes. A great selection. This wealth must have been noticed by the owners of one of the houses in the town for their edge is made by all these plants grouped together. There are so many plants in less than a mile of this road that one could easily establish a local botanical garden based on its range.

Why heterogeneity? One last example: it is now time to discuss the relationship between our gardens and the decline of biodiversity on planetary scale. The widespread use of English lawn and consequent destruction of the indigenous habitats could have disastrous consequences on flora and fauna, more specifically on small population of plants and animals that live in specialized environs. The constant expansion of the suburbs and the implementation of the English lawn has eradicated the habitat of many birds and favoured the spreading of more versatile species, those that more readily adapt to life with humans. A comparative study conducted in Illinois revealed that the species of birds inhabiting urban areas are the same everywhere, whilst other kinds of habitats still present specific differences from one region to the other. The loss of biodiversity in urban areas goes therefore hand in hand with the absence of diversification in bird species.

After two centuries focused on isolating, separating and hybridizing with the intent of privileging a specific vegetable quality and after the indiscriminate introduction of some species in unsuitable areas, after whole monocultures have been wiped out by diseases, it is now time to reintroduce heterogeneity: the well being of the species inhabiting abandoned fields must be considered a precious feature of the landscape.

Heterogeneity, understood as diversification of content, does not aim to privilege any specific aspect; it does not favour one element at the expenses of another. In the role of landscape designers we introduce in a specific area some elements borrowed from nature and according to the different environmental conditions we utilize them in different ways. The city is therefore re-thought and the concept of urban area re-invented without necessarily making it dominant as when heterogeneity unfolds in its richness no element prevails over others.

This idea of diversity and heterogeneity is also shared by Atelier le Balto [5] whose dilemma effectively is that "a garden is neither definitive nor ephemeral but transitional" [6] using the term transitional in the sense of dynamism that is part of nature with its ever-modifying conformation also beyond human intervention. [7]

To highlight this aspect, the three French landscape designers that work in the Atelier describe their practice as: "the art of assembling materials and plants; the art of utilizing existing natural elements; the art of integrating landscapes and gardens or to create views over the landscape; the art of inviting to move or to take a break, to speed up or slow down, to sit or to follow other movements; the art of thinning trees; the art of choosing and planting vegetable to then take care of them; the art of sewing; the art of being surprised and to surprise ourselves; the art of provoking and that of waiting; the art of improvisation; the art of transforming; the art of discussing with clients; the art of circumnavigate an order, or to invent it or to create it. It also is the art of watching something grow…"

This new attitude towards nature, the garden and vegetation in general constitutes an extraordinary opportunity to create new models that challenge establish modes of thought from the root to the top, asking what is a garden and the space around it understanding the vitality and social role and to attempt a new planning of metropolitan areas. From this perspective, the series Oltre I Giardini attempts to bring to light the new developments and theories, without wanting to impose a single model but multiple evolutions to establish a dialogue in dynamic becoming.

The garden has been a privileged place of experimentation and anticipation of evolutional processes related to the home and the city, the first stop towards the occupation of environments and the perception of the environment as landscape. This heritage, grounded in one of the pivotal foundations of architecture, demands an ever-increasing effort in the understanding landscape and environment as a crucial key of out time.

References

[1] Michela Pasquali, Giardini a New York. Storie di Guerrilla Gardens, 2008, Bollati Boringhieri, Torino

[2] Patrick Blanc, Il bello di essere pianta, Oltre i Giardini, Bollati Boringhieri, 2008, Torino

[3] Daniele Fazio, Giungla sull'Asfalto. La flora spontanea delle nostre città, Blu Edizioni, 2008, Torino

[4] Diana Balmori, Tra fiume e città, Paesaggi,
progetti, principi, Oltre i Giardini, Bollati Boringhieri, 2009, Torino

[5] atelier le balto, Archipel. L'arte di fare giardini, Oltre i Giardini, Bollati Boringhieri, 2008, Torino

[6] Brisson J. L., «Jardiner. Les carnets du paysage», n° 9 e 10, Actes Sud, 2003, Arles

[7] Hansjorg Küster, Storia dei boschi. Dalle origini a oggi, Oltre i Giardini, Bollati Boringhieri, 2009, Torino

Diana Balmori
The Garden Climbs the Stairs, Bilbao, 2009 © Diana Balmori

Michela Pasquali is a landscape designer and botanical expert who has designed gardens in United States as well as in Italy. She is the Editor in Chief of the series Oltre I Giardini (Beyond Gardens) published by Bollati Boringhieri and also works as a lecturer of Garden Design at IED, Turin and of Interiorscape at the Fundacion Fernando de Castro in Madrid for the Escuela Politecnica. Pasquali has also published for Electa (2000) I Giardini della Diplomazia (The Gardens of Diplomacy); a+mbookstore (2006) Ambasciate e Accademie a Roma (Ambassades and Academies in Rome) Loisaida NYC community Gardens (…) Bollati Boringhieri / Giardini di Manhattan (Manhattan's Gardens) and Storie di Guerrilla Gardens (Stories of Guerrilla Gardens).

"FANCIFUL AND VERY MUCH ALIVE": PLANTS, PRINTS AND DRAWINGS

Stephen Burt's work invents "natural" forms that often cast plants as central dramatic figures, re-imagining rather than replicating the social relations of species. Unabashedly rich in detail and color, his prints and drawings reveal the artist's lifelong fascination with "the curious and the small" as well as his years of studying and copying Old Master prints. Here he discusses these aspects of his work in an exclusive interview with Susan McHugh.
Interview questions by Susan McHugh

Susan McHugh: Stephen, how did you get started with printmaking, and why do you return to it?

Stephen Burt: Printmaking was attractive to me from early on, as an undergraduate at RISD, because I could build an image slowly over time, tweaking it, adjusting it until it was complete. And then each image could be printed in multiple ways. Also I had some inspirational instructors at RISD who encouraged my interest in invented "natural" forms.

[Sm]:The histories and inventions of natural forms are common elements across your work, implicit in titles like "Ornament for Euridyce" and "Ornament with Birds." But am I right in thinking that your use of "ornament" refers to a plant-like substance, or does it mean something else to you?

[SB]: Ornament as a title is a nod to the beautiful ornaments of 15th-century German artist Martin Schongauer, and to a lesser extent Isreal Van Meckenem. Their ornaments were indeed plant-like. Schongauer's work at first sight floored me and led directly to my interest in capturing some of the intricacies of engraving found in his work as well as the narrative power. I spent a great deal of time copying original prints at the Fogg Museum at Harvard, which has an amazing collection of Old Master prints. The curator of prints at that time was Marjorie Cohn who was invaluable in introducing me to the collection and setting aside works for my research. Some of the copies I made were fifty to sixty hours of labor so they obviously required multiple visits. Copying to build haptic memory and skills is thought of these days as anachronistic, yet I think it is an essential component in an artist's education. One cannot draw something well without knowing it very well. And narrative strategies are included in that assessment. I read about and studied the work of Schongauer, and that of Durer (who studied Schongauer very closely), Holbein (who studied Durer very closely), and Rubens (who studied Holbein very closely). These artists led me back to prints after quite a long hiatus into painting.

[SM]: What do you mean by the narrative power of Schongauer's work in particular?

[SB]: Schongauer's work is ostensibly decorative, but for me it also has great narrative depth and interest. The plants are fanciful and very much alive, both in their sense of movement and as an active arena for thought. His images exhibit an amazingly consistent focus from the macro- to the microcosmic. He creates complex scenes that

Stephen Burt

Ornament for Eurydice, 2005, Etching with chine collé. Edition: 50, Plate 22.5” x 16.25” Paper 30” x 22”, printed and published by the artist.

are coherent in the long view and reward the close view with as much detail as physically possible. And he stands in admiration of nature; you feel it when you see the care that he devotes to depicting it. I consider his works some of the more beautiful in the history of printmaking.

It's interesting that you mention his plants, because one of the more fanciful elements of your etchings is that they offer an intriguing perspective by depicting insects, birds, and people alike all as smaller than the plants surrounding them. They create and present whole environments in an organic way that underscores dependency of fauna on flora, offering a different viewpoint from the stereotypical environmental-stewardship way of thinking, which posits people first, as in control or dominating the scene.

I had not thought about the apparent dependency of fauna on flora in my works but your observation makes a lot of sense because that certainly is my attitude and feeling about plants and nature in general. The construction of an environment is key to my thinking. Every piece exists in balance with every other; it has to make formal sense and emotional sense as well.

[SM]:You're helping me to understand a tension in your drawings that, for instance, imagine twenty-first century Costa Rican landscapes through 15th- and 16th-century naturalist motifs and techniques. Thinking of how tsunamis and hurricanes have become staples of recent media spectacle, I also see an immediacy, even an ominousness, in an image like We'll Meet Again…. What motivates you to want to bring such highly charged formal and emotional qualities into balance?

[SB]: I have always found that it is more compelling to re-imagine rather than replicate, perhaps in part because a camera can record things only with a certain kind of frozen veracity. So what I do, or want to do, is to take the aspects of place and structure and accent them, memorialize, memorize them. I used to take a lot of photos but found them always disappointing ("it did not look or feel like that"). Now I do not utilize photos. Maybe it is the artist's desire to create an ideal world. In my work with landscape, I certainly have taken out all vestiges of human "interference" and made a kind of primal stage to express my feelings and thoughts. I think if I included contemporary data it would drain all the wonder and fantasy out of the process for me, and just be a replication of a world instead of evoking one.

My experience as a teenager in Iran for two and a half years, in the process witnessing the Iranian Revolution, was critical to my development as a person and as an artist. Islamic decorative art fascinated me although I confess I did not know how to utilize it at the time. Living through a great social upheaval was extraordinary and on some level much of my work touches on that time in my life.

[SM]: As far as the ominous note, it is certainly there, down to the use of the title We'll Meet Again…, which refers to the song in the closing credits to one of my favorite movies, Dr. Strangelove. Although weather and environmental chaos reign rather than nuclear holocaust, it seems to me that humans are rapidly going to hell in a handbasket if we do not shift course very soon. What kinds of response have you had to these images, especially the ornament ones that more explicitly show humans as diminutive figures in contrast to plants?

People seem to admire the ornament prints but I must say they (the ones with the humans) do not seem to sell as often as I would like, although they have been juried into quite a few exhibitions. They have a certain black humor to them that takes a certain audience, I think . . .

. . . as well as an appreciation of your incredible commitment to draftsmanship? Before meeting you or even seeing your work, the very first thing that I learned about you was from another artist, and it was that she was envious (as I am also) of your drawing skills.

I draw every day. It's not always for as long as I would like to, but it's enough to stay in practice as well as to keep reminding myself that I'm an artist.

[SM]: Could you say more about color, especially in your botanical drawings? in which the colors are limited in range yet so intense, so much a part of the scene, and in a way that produces the effect of seeing plants in their ordinary habitats. How do you approach these color choices?

[SB]: The color has a specific tenor. Prior to travel down to Costa Rica I prepared a quantity of paper to draw on. Once there I realized the colors did not match the atmosphere I needed to convey (I had prepared colors that matched my New England frame of mind, not that of CR).

Stephen Burt

The Flower of Love (Lust) 2009, Etching with chine collé. Edition: 50, Plate: 23.5” x 14.5” Paper 30” x 20.5”, Printed and published by the artist.

I ended up starting over and experimenting to find the proper palette. Working on a colored ground for me highlights both the abstract qualities and the emotional tenor of the drawing. I like to use paper that I hand-color with watercolor washes. The unevenness and imperfections suggest different ways of seeing. And I can choose the exact color I want.

[SM]: So what is the relation of this initial choice of color to the plants that you then draw over it?

[SB]: The color is the arena or ground from which the drawing emerges. This molding of the ground into "form," through the additions of lights and darks, is still surprising for me. It's surprising and mysterious that something so patently abstract can at the same time suggest illusionistic space and life.

[SM]: You're reminding me of something that you've said about your engravings, which concerns the role of line as well: "Each mark . . . reveals the trace of the artist's movement and life, yet also creates the illusion of a separate life." Could you say more about your take on the role of form and its Renaissance roots more generally in your work?

[SB]: Line and marks are points moving through space. I believe if you look at them carefully you can tell a great deal about how they were made as well as the feelings and intent of the artist. We like to think that we have a monopoly on abstract thought, that we have advanced as a culture. Yet artists in the Renaissance were very engaged in abstract thinking, the use of intuition and accident to inspire, and the use of formal skills/ strategies to tie it all together.

I utilize Old Master-inspired techniques because work of that time period is cinematic in its narrative construction; it just keeps going…. I want the viewer to be rewarded and encouraged to dwell on the things I create. I did not realize until I had spent a great deal of time with work of the 15th and 16th centuries just how much depth was in it. I had to look a long time to see it.

Utilizing formal historical strategies is one more way to bring a level of depth to my image, and of developing how one thing is like another. A line might evoke water as well as foliage---the more analogies, the more inherent possibilities there are for the viewer but also for me---which makes the process of drawing a kind of guided improvisation. *In this sense, your work glaringly contrasts the postmodern aesthetic that cultural critics like Frederic Jameson critique as symptomatic of a politically dangerous "disappearance of a sense of history" in contemporary consumer-oriented society.*

I would say there is a certain reluctance in some circles to see what I do as "contemporary." I do not think about that much, as the way I work is the way I need to work. It is compelling, challenging, and I have an amazing array of inspirations to riff off of in the work of the past.

[SM]: Can you elaborate your sense of what motivates this reluctance? because to me it speaks volumes about the social stakes of aesthetics today. What I mean is that, with the embrace of conceptual, installation, and performance styles in fine art, it seems like along the way anything beautiful has become trivialized, any commitment to draftsmanship has become suspect. Of course, this isn't just true of visual art---for instance, at the same time contemporary literary studies began riding an endless wave of autobiographical narrative forms characterized by a confessional style of realism that is narrowly defined through shocking scenes of outrage and cruelty---but it makes me wonder: is this what makes your practice so deliberately informed by art history?

[SB]: I would say in a word, yes. Art history is important. As Auden put it so well "About suffering, they were never wrong,/ The Old Masters; how well, they understood…" Our lives and thoughts are very complex, and I do not think much of contemporary art seeks the level of complexity that, say, Rubens sought in his work. It's level of complexity that, to our contemporary eyes, can seem overwrought, until one takes the time to really look.

One of my primary concerns as a maker of images and as an instructor of art is to promote contemplative observation. Close discerning seeing is a quality neither promoted nor sought after in most circles these days. Almost every aspect of information communication and consumer systems seems to work actively against it. And without it I think we are, as individuals, and as a society, impoverished.

I want my work to be beautiful, not necessarily in a narrow sense . . . perhaps rich is a better term. I find much of contemporary art more influenced by commercial strategies of maximum impact, catch phrases, and only a vague or

Stephen Burt
Palm 2009, Conté crayon on green prepared paper, 30” x 21” © Stephen Burt

implied sense of history. That said, one of the living artists I most admire, Lucian Freud, is one of the finest painters in history.

[SM]: Your choice of content, focusing so often and intensely on plants, insects, and other invertebrates, in a very different way sets your work apart from a mainstream that many biologists as well as those of us working in interdisciplinary animal studies have complained focuses too heavily on charismatic megafauna, particularly mammals. What attracts you in particular to these other categories of creatures?

[SB]: Although I love megafauna as much as anyone, I have always gravitated towards the curious and the small. The exceptionality and diversity in the plant and invertebrate world is really quite something when you begin to look closely.

[SM]: In reference to your print series Insects---all imaginary?---you say, "A bug is more than a bug; it is a whole universe that resonates with possibility." I love this perspective, which echoes philosopher Gilles Deleuze's poststructuralist model of life itself as vibrating with intensity, as elementally constructed by desire and the social, in part because it works so well to explain why historically philosophers have failed to address the complexities of human let alone any other forms of life. Yet, would you replace "a plant" for "a bug" in that statement?

[SB]: The insects are imaginary although I do have real insects upon my desk to remind me not to stray too far from the life mode. And I could definitely replace the word "bug" with "plant." They seem the same to me, both living, breathing life forms. I have been working longer at drawing the insects but have worked on a number of singular flowers over the years. It is interesting to see how I have circled back to some of my earliest art works as a child, inventing plants and animals along with a fascination with scientific illustration.

[SM]: Yet you do not put science before art (or art before science), for instance, when you observe, "In order to communicate aspects of the world, artists and scientists must reduce the complex into diagrams and symbols, losing information in the process of gaining it." Can you elaborate this sense of the shared diagrammatic or symbolic aspects of art and science? And maybe too how this perspective informs the ways in which your work bridges gaps in the arts and sciences?

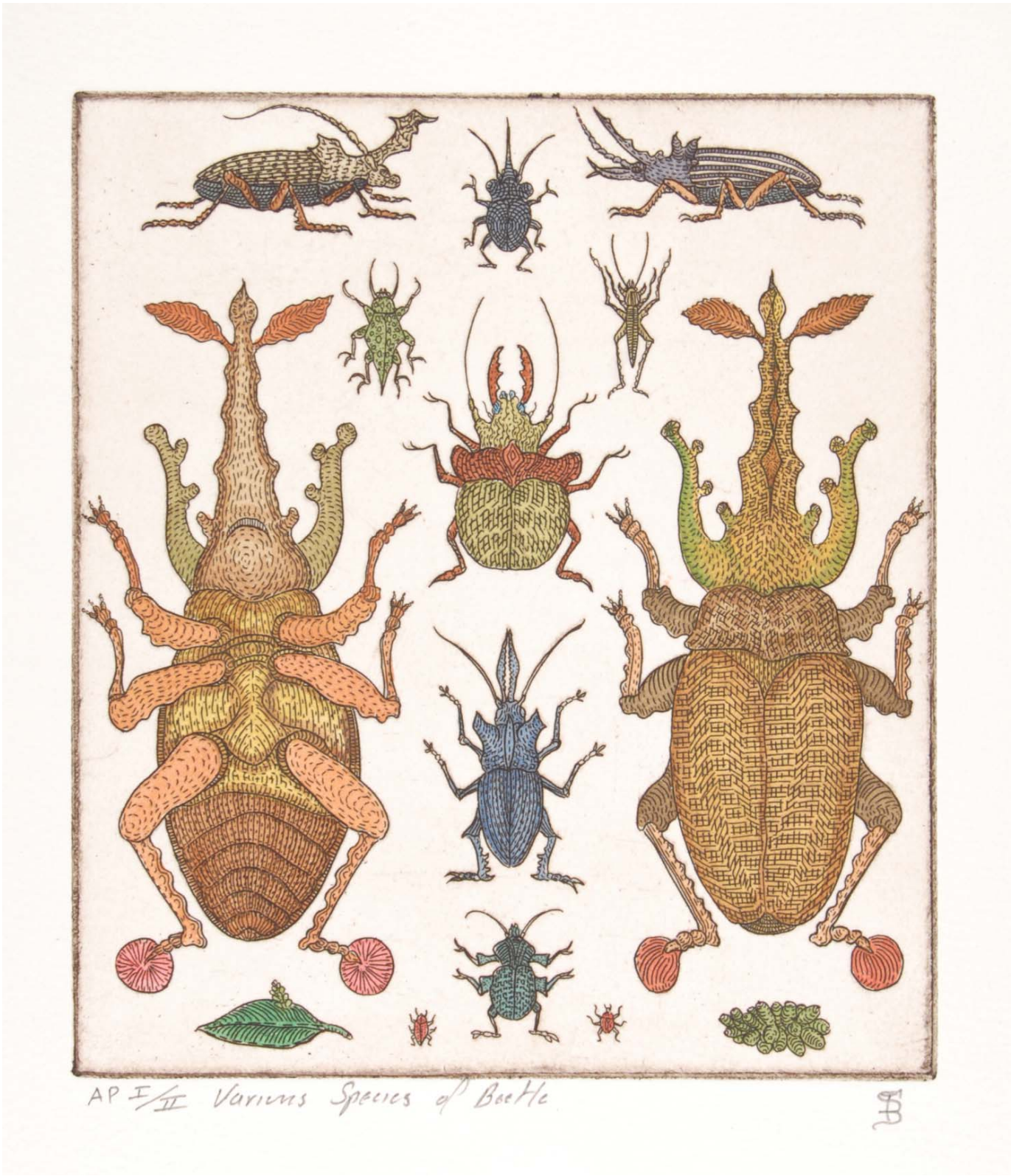
[SB]: All art is a series of symbols arranged for specific effects, whether it is to evoke light, texture, space, movement, etc. Scientific illustration has its formalized light, always from the upper left at 45 degrees, which interestingly is a Renaissance formal strategy that came to be seen as best evoking illusionistic form (Roman and probably Greek artists used this directional light as well). And scientific illustration must keep images clear and precise to convey information even while minimizing other information such as color, the sensation of movement, or perspective depth. I love the idea that my work could bridge disciplines, because it certainly does for me.

[SM]: Well, a case in point is the artist's book you recently completed in collaboration with our colleague Pam Morgan, who's an environmental scientist. How would you describe this project? And how did it come about?

[SB]: The book you refer to is one of invertebrates consisting of eight plates with taxonomy and scientific descriptions. The book is fictional yet posited as if it were the results of real research, and it came about because I had spoken with Pam a number of times at faculty meetings. Her obvious intelligence and sense of humor (crucial!) led me to ask her if she would consider providing descriptions of some of my work for a book project that was conceived some years back. After we had discussed working together we met so that she could review the prints. The first thing she said was "Well, they are all obviously invertebrates." I have to say, although I had conceived them as a series and from the outset considered the group "related," I had not thought of them as invertebrates. I had made the plates but needed someone with the conceptual flexibility and personal interest to make the work plausible and interesting. Without Pam's contribution the book would just be some odd "natural" forms. With her work it becomes something altogether richer . . . .

[SM]: Is there any chance you two will do another book together, maybe one focused on plants?

[SB]: It's funny you should ask, because we just received a grant to do a similar book on carnivorous plants.



Stephen Burt
Various Species of Beetle, 2010, Hand-colored etching, Plate: 6 ¾" x 5 7/8"Paper 12" x 11" Arches Cover, Printed and published by the artist AP1/2 from an edition of 20 with 2 artist's proofs. © Stephen Burt

[SM]: I'm so glad to hear that, in part because the first one is such a rich project! And it's intriguing to learn that sharing a sense of humor is a premise for this rare collaboration of artist and scientist as equals, working together in the interest of conceptual interplay. What advice would you offer to other artists seeking to engage with scientists in this kind of work?

[SB]: I think it is important to keep an intellectually open mind to the broad range of scientific, literary, and artistic endeavors. You never know what avenues can open up. Collaboration is so interesting because that second set of eyes/

thoughts/ ideas leads to the unexpected. Of course having to discuss any concept is always eye-opening. It can be awful when art gets too self-involved and insular. Art and science are constantly in dialogue with each other in a way that we just take for granted through the use of images. Imagine the study of anatomy without illustrations.

[SM]: Knowing that research is important to your process, I want to conclude by asking: what are you reading right now?

[SB]: I have been reading Aloïs Riegl's *Historical Grammar of the Visual Arts.* I can't say I quite understand it all just yet, but it is a fascinating book on man's conflict with nature and how that has shaped art. Just brilliant writing, although not for the faint hearted!

Stephen Burt
Ornament with Birds, 2004, Etching. Edition: 30, Plate 8" x 17.75" Paper 13" x 22.5", Printed and published by the artist.

Stephen Burt is painter and printmaker living and working in Portland, Maine. Born in Deland, Florida in 1962, Stephen Burt has traveled extensively and most notably lived in Tehran, Iran from 1976 through 1978, witnessing the revolution. This formative period in the artist's life nurtured both an interest in the power of decorative form drawn from Islamic art and an abiding interest in the dynamics of human passions. Educated at Rhode Island School of Design (BFA 1987) and SUNY Purchase (MFA 1991), Burt's work can be found in numerous public collections, including The Fogg Museum at Harvard, New York Public Library, and the Library of Congress. He is a recipient of grants from the Pollock-Krasner Foundation, Ludwig Vogelstein Foundation, and Ruth Chenven Foundation, among others. An active member of Peregrine Press in Portland, Maine, Burt currently teaches drawing, painting, and design at the University of New England, where he is Associate Professor and Chair of the Creative and Fine Arts Department.

Stephen Burt was interviewed for Antennae by Susan McHugh in Summer 2011 © Antennae.

WAITING: A MEDICINAL GARDEN FOR AILING PLANTS

"God is very rarely a plant and many people think of plants as furniture. From Aristotle to Kant to Darwin, life is running around biting your mate. What does a plant do in its spare time?"
Ramon Guardans (1)
Text by ***Ingrid Periz***

Janet Laurence
Waiting - A Medicinal Garden for Ailing Plants, 2010, Australian native plants, laboratory glass, blown glass, steel, horticultural mesh, acrylic, salt, amethyst, medical silicon tubing, water and various fluids, ink jet prints and screen prints on acrylic, water crystals, tulle, carbon, sulphur, various plant seeds, charred wood and plants, water pumps, ash*;* photography credit:
Photography: Jamie North © Janet Laurence and Jamie North

The Western medicinal garden has taken various forms: the monastic physic garden, typically located close to the infirmary; the university-affiliated gardens of Renaissance Europe, dedicated to the academic study of medicinal plants; the fenced kitchen gardens of colonial North America, where healing herbs were grown as close as possible to the master's house. Whatever the configuration, grand or domestic, the medicinal garden held plants that healed. Humans kept plants that would keep them.

Janet Laurence's *Waiting: A medicinal garden for ailing plants,* a major installation for the Sydney Biennale of 2010, was imagined, loosely, as a medicinal garden but one where the onus of care has shifted. Instead of the simples and herbs of the European pharmacopeia, "Waiting" sheltered a range of Australian native plants, some healthy, some ailing, and others dead. Contained in laboratory vessels connected to a network of tubing, the plants were housed in a large transparent pavilion with membranous walls extremely sensitive to changes in light and temperature. A solar-powered pump kept water circulating; condensation happened of its own accord with the arrangement working like an overarching metaphor for the work of plants themselves. Recalling in its structure and function both the botanical glasshouse—a light-filled structure dedicated to living plants—as well as the museological vitrine—repository of dead specimens—"Waiting" comingled life and death, decay and resuscitation. But this fantastic machine could not revive all the plants it contained and the appearance of life support was an illusion, framed by Australia's environmental fragility, water shortages and species loss. The work staged the medicinal garden as tent hospital, where plants are held in triage. (2) Plants keep us, can we properly keep them?

Laurence has worked remedially with plants in the past. Her "In the shadow" was an explicitly reparative work undertaken for Sydney's Olympic Park in Homebush Bay in 2000. Here Laurence regenerated a polluted waterway, incorporating extensive plantings of Casuarina and she-oaks with moving fog while the site's water chemistry was tracked by twenty-one glass measuring wands which registered its change over time. When the work was completed these wands dominated, now ten years later it is the plants that have reclaimed the site, bringing in their turn, insect and bird life. To the extent that the intervention's registration—the measuring wands—have been obscured by natural growth, the work of art has disappeared, a remarkable result for a piece of public art. "Waiting" too will disappear from its site in Sydney's Royal Botanical Garden, obeying instead the laws of contingency that govern contemporary installation practice. Its afterlife existence in the extensive photo documentation that is also a feature of contemporary practice shows something both bleaker and more fantastic than the regenerative work of a decade ago.

Glass

Nodding to the glasshouse and the vitrine, "Waiting" also conjures up another glassy container for plants-- the Wardian case, a glazed wooden box devised by the physician, fern enthusiast and amateur entomologist, Dr. Nathaniel Bagshaw Ward. In 1829, while studying the life cycle of a moth, Ward noticed a tiny fern growing in a covered jar in which he had placed a cocoon six months earlier. Unlike the tired ferns of his Wellclose Square garden, struggling in London's coal smoke, the fern spores which germinated in his entomologist's bottles thrived. Ward contracted a carpenter to build a closely-fitted case and discovered an ideal growing environment for ferns.

In 1842 Ward published *On the Growth of Plants in Closely Glazed Cases*; the second edition appeared ten years later, by which time Ward was envisioning great ameliorative and recuperative effects for a much larger version of his device. In this he echoed the words of Joseph Paxton, designer of the super glasshouse known as the Crystal Palace and a key proponent of its conversion, at the close of the Great Exhibition for which it was designed in 1851, to a sanatorium for consumptive patients. Ward, believing measles and tuberculosis could be cured by purified air, wrote, "…the Author hopes he may be pardoned in directing the attention of medical men to the possibility of constantly surrounding patients with a pure atmosphere, which, he imagines, will eventually be effected by a combination of vital and chemical forces." (3). He imagined the widespread adoption of Wardian cases as fixtures on city-dwellers' windows for by these means "London, or any other large town, might be converted into one vast garden". (4) Although Ward's science was faulty---he discounted the evidence that what is now called acid rain was the cause of plant decline in industrial cities and imagined that the enclosed air within the sealed Wardian case could work to cleansing effect on the external atmosphere—his fantasy of a million

Janet Laurence
Waiting - A Medicinal Garden for Ailing Plants, 2010, Australian native plants, laboratory glass, blown glass, steel, horticultural mesh, acrylic, salt, amethyst, medical silicon tubing, water and various fluids, ink jet prints and screen prints on acrylic, water crystals, tulle, carbon, sulphur, various plant seeds, charred wood and plants, water pumps, ash*;* photography credit:
Photography: Jamie North © Janet Laurence and Jamie North

plant-filled glass cases making London "one vast garden" resonates with contemporary arguments for greener cities.

The vast garden that Ward helped create was less London than the British Empire, and ultimately the globe itself, for his glazed cases made possible the reliable transportation of plants and seedlings across oceans. Prior to the adoption of his device this had been a fraught enterprise with living plant material subject to salt spray, temperature extremes, dehydration, rodent attack and lack of light.(5) Wardian cases enabled the British to shift tea production from Shanghai to Assam, transplant Chinese bananas to Fiji and Samoa, and, using rubber tree seed gathered in Brazil and raised in the glasshouses of Kew Gardens in London, establish rubber plantations in Malaya and Sri Lanka, transforming local economies, agricultures, labour practices and cuisines in the process. For good and ill, these transplants remade the world.

Laurence uses species native to Australia but her work situates itself in the new global garden created by the colonial enterprise. One of the first uses of the Wardian case was in the shipment of two Australian plants—Gleichenia microphylla, a type of coral fern, and Callicoma serratafolia, commonly referred to as "black wattle"—to England in 1834, an eight month voyage during which the temperature fluctuated 100 degrees Farhenheit. (6) Seeds of the black wattle successfully germinated en route; in Sydney the tree was used extensively in wattle and daub construction in the early colony to such an extent it is no longer found in the area. When Laurence, with artist Fiona Foley, was commissioned to produce a commemorative work for the Museum of Sydney in 1994, she used salvaged black wattle timber along with other depleted local species in the jointly produced "Edge of the Trees" (1994-5), a work marking the museum's site as the first zone of contact between the original Cadigal people and their British colonizers while also recording the losses subsequent to that encounter.

The life of plants is not outside the time of human history. "Waiting," situated on the former site of the Sydney Garden Palace which was built to house the Sydney International Exhibition of 1879 and designed by New South Wales colonial architect James Barnet as a reworking of Paxton's Crystal Palace, casts this relationship in the contemporary mode of crisis rather than Victorian celebration. Plants and humans are both ailing in the current hothouse.

Waiting

"All plants require rest," wrote Ward and he understood this not as an absence of activity so much as a marshalling of forces. (7) Contemporary models of plant growth confirm this. Halfway into the diary of a year spent observing the life-cycle of a clump of the common European weed thale-cress (Arabadopsis thaliana) in an English churchyard, plant geneticist Nicholas Harberd writes, "Previously, it was thought that plants grown in adverse environments grew poorly because they were 'sick', weakened by bad conditions, their metabolism compromised…this picture is incomplete. The inhibited growth, at least in part, is something the plant is doing to itself. It is an active, regulated thing rather than a passive-response thing." (8) Guardans, too, refutes the passive, vegetative model of plant growth and cites plant allometrist Karl J. Niklas, "The physical environment and the laws that describe its behavior do not operate on a passive, totally submissive organism. By its growth in size and its potential to alter shape and structure, an organism can influence and even alter the extent to which the physical environment affects the rates and means of energy transfer." (9) Thus, as Guardans notes, a plant will thicken the protective waxy coating called a cuticle on leaves growing in the sun but not those of leaves growing in the shade. He suggests a signaling response at work in all plant organisms and imagines a 3,000 year old tree as a "business of wind and water [management]" built on "a lineage of daughters." (10)

If plants can rest, can they also wait? Harberd indicates as much when he writes about DELLAs, a family of related proteins that restrain the growth of plants. Growth, understood as a property of the plant as well as the environment, occurs through a series of interactions between DELLAs and the plant growth hormone gibberellin. Harberd calls DELLAs "the agents of restraint that restrain growth to a degree consonant with the conditions within which the plants find themselves. Lacking DELLAs, a plant becomes insensitive, brash, a fast-liver that is unable to exercise appropriate restraint, and that dies young. The appropriateness of restraint is a message that we ourselves need to heed." (11)

To speak of plants waiting invokes the possibility of an agency that disturbs the usual distinction between subject and object but this is precisely Michael Pollan's gambit in "The Botany of Desire" where he relates the history of four plants---apples, tulips, cannabis, and potatoes—as stands in for all the plants domesticated by

Janet Laurence

Waiting - A Medicinal Garden for Ailing Plants, 2010, Australian native plants, laboratory glass, blown glass, steel, horticultural mesh, acrylic, salt, amethyst, medical silicon tubing, water and various fluids, ink jet prints and screen prints on acrylic, water crystals, tulle, carbon, sulphur, various plant seeds, charred wood and plants, water pumps, ash*;* photography credit:
Photography: Jamie North © Janet Laurence and Jamie North

Janet Laurence
Waiting - A Medicinal Garden for Ailing Plants, 2010, Australian native plants, laboratory glass, blown glass, steel, horticultural mesh, acrylic, salt, amethyst, medical silicon tubing, water and various fluids, ink jet prints and screen prints on acrylic, water crystals, tulle, carbon, sulphur, various plant seeds, charred wood and plants, water pumps, ash*;* photography credit:
Photography: Jamie North © Janet Laurence and Jamie North

Humans. (12) For Pollan, this history is the story of plant and human coevolution, of what plants do to human appetites-- for sweetness, beauty, intoxication and control in his four examples—to further their own evolutionary advantage. If in Pollan's words, "it makes just as much sense to think of agriculture as something the grasses did to people as a way to conquer the trees," and if we are to adopt the more recent activist models of plant life, perhaps we can ask what it is that plants wait for.(13) In the scenario of Laurence's "Waiting" their patience is almost at an end.

References

1. "Plant physics: on the silent power of waiting" by Ramon Guardans, Journee ASIL (Art/Science/Instrumentation/Langage) DE L'IméRA, "Art, culture, théorie de l'évolution" Jeudi 22 octobre 2009, Maison Méditerranéenne des Sciences de l'Homme, Marseilles, France.

2. On the field hospital metaphor, see Felicity Fenner interview with Janet Laurence, "A hospital for plants: The healing art of Janet Laurence,"Art & Australia 48:1 (2010), pp. 64-5.

3. Nathaniel Bagshaw Ward, On the Growth of Plants in Closely Glazed Cases, 2nd ed. London: John Van Voorst, 1852; p. IX.

4. Ward p. 93-4

5. Fraught or no, the sea-borne traffic in plants was centuries old before it was transformed by Ward's invention. At the end of the eighteenth century botanist Joseph Banks, in receipt of plant specimens from collectors throughout the world, sent casualties to a special hothouse in the Royal Botanical Gardens at Kew. He called this "our Kew hospital." Andrea Wulf, The Brother Gardeners: Botany, Empire and the Birth of an Obsession, (New York: Vintage Books, 2010) p. 216

6. Ward, pp. 73-4.

7. Ward. p. 7.

8. Nicholas Harberd, "Seed to Seed: The Secret Life of Plants," ((London: Bloomsbury, 2006) p. 197. Harberd was additionally directing a research team studying the genetic determinants of thale-cress growth during this period. Arabadopsis thaliana is the fruit fly of plant genetics.

9. Guardans, p. 17, citing Niklas, Plant Allometry: The Scaling of Form and Process (Chicago: University of Chicago, 1994), p. 62)

10. Guardans, p. 18.

11. Harberd, p. 302.

12. Michael Pollan, The Botany of Desire: A Plant's Eye View of the World (New York: Random House, 2001).

13. Pollan, p. xxi.

Janet Laurence exhibits widely and has an impressive record of representation in important group exhibitions, including the 9th Biennale of Sydney (1992) and Australian Perspecta (1985, 1991, 1997). Following her solo exhibition in 1991 at Seibu Gallery, Tokyo, and since she was awarded an Australia Council studio residency in Tokyo in 1998, Laurence has exhibited regularly in solo ad group exhibitions in Tokyo and Nagoya. She was invited to create a permanent installation for the 2006 Echigo-Tsumari Art Triennial in japan.

Her most recent solo exhibitions in Australia include 'Birdsong', Object Gallery, Sydney; 'Janet Laurence', Jan Manton Gallery, Brisbane (both 2006); and 'Greenhouse', Sherman Galleries, Sydney (2005). A survey exhibition of her work was held in 2005 at the aANU Drill Hall Gallery, Canberra.

Well known for her public commissions and architectural collaborations, Janet has completed significant national and international projects, such as the 'Tomb of the Unknown Soldier', Austrlian War Memorial, Canberra (1993).

SILENT RUNNING

Helen Pynor's latest body of work is unerringly beautiful. Budding native plants float in the ether, seeming to gently sway amidst the clouds, tenderly cocooned in fragrant tissue, romantic bouquets of red gum and wattle, a lover's carefully arrayed gift.

Text by Ashley Crawford

AS always with Pynor's work, there is something amiss in these timelessly elegant images. In the past she has utilised the tissues and organs of the human body to suggest traditional means of attending to illness – at times, in this age of pharmaceutical-obsession, seeming so archaic as to sound like fairy-tales, in other eras no doubt perfectly sensible. In those works the organs hung in some form of viscous fluid, like the results of a painstaking autopsy. For all of the unusual materials, the dedication with which her practice is arrayed made those works oddly palatable. Words were stitched from hair and tendrils appeared to drift and float into the surrounds, freed from gravity.

There are similar tendrils floating in these new works, but in this case they are plants' roots, not so much torn from terra firma as delicately removed. It is nigh impossible not to feel the delicateness of these root systems and to be reminded of the similarly complex structures of the human nervous system. Pynor herself has described the exposed roots as being almost the equivalent of "nakedness" but it is hard not to feel that the root systems are more than that. To be naked suggests a degree of vulnerability, but these root systems go far deeper, these are organic filaments that were never designed to be exposed, that have been flayed from the earth. They have developed over millennia to dig deep into the soil and seek out the moisture from the darkness and to give succor to the leaves and flowers above.

For all of the intellectual curiosity that feeds into Pynor's work, the results are always far more sensual than academic. There is a decidedly feminine sensibility at play here. While research may be the core initial motivation, it is the appearance, the delicacy, that remains tantamount. Simultaneously there is a distinctly surreal and almost alien aesthetic that arises. These could well be specimens collected by an alien race, delicately removed from the soil, roots undamaged, somehow still flowering in an alien atmosphere.

Pynor's works are somewhat reminiscent of the final scenes of the 1972 film *Silent Running* in which Earth's last remaining forests are secured in greenhouse-like geodesic domes outside the orbit of Saturn. It is hoped to return them to an apparently barren Earth in order to reforest the planet, but such a plan becomes economically unfeasible and the resident botanist, played by Bruce Dern, is ordered to destroy the forests. He refuses and manages to jettison one dome to

Helen Pynor
Milk 3 (bird's nest fern), 2008/2009, C-type photograph, face-mounted on glass © Helen Pynor

Helen Pynor

Milk 7 (she oak), 2008/2009, C-type photograph, face-mounted on glass © Helen Pynor

Helen Pynor
Milk 9 (paperback), 2008/2009, C-type photograph, face-mounted on glass © Helen Pynor

safety, dying in the process. In the sequel, released in 2008, the botanist is played by Helen Pynor who is trying to secure the dying traces of a fore-gone world.

As with her previous work the embroidery at the top of each image gives us a more substantial interpretation, counterpointing the ethereal nature of her floating world. For this project, Pynor's choice of plants was guided by Dharawal medicinal remedies, passed on to her by the Aboriginal botanist and Dharawal man John Lennis (The Dharawal are the indigenous people of what is now southern Sydney and the Illawara region). For the Dharawal each of these plants has a very real function in the very real world. Pynor's *Milk 4 (wattle)* is captioned "wattle – dysentery." Sweet pittosporum, we discover, is used as a poultice for swellings, Sydney red gum as a treatment for diarrhoea. What we may casually put in a pot on the window-sill has distinctly pragmatic uses in the Dharawal world.

This is, perhaps, where the creeping sense of melancholia that infuses Pynor's work becomes more acute. Pynors' project suggests a system of memory retrieval, an archaeology of frayed knowledge. Throughout her oeuvre she has dredged for and then suggested the past; prior knowledge of how to treat the human body for its inevitable physical and psychic ailments.

Despite their literal subject, the human body is deeply imbedded in these works. The fluids that her plants float in, have their unusual genesis in digestive juices, mucus, bile and blood, the fluids that circulate in the body to absorb whatever goodness they can. But when things go terribly wrong the surrounding bush could supply succor to the suffering. Numerous solutions could be found to ease many ailments; menstrual problems treated with false sarsaparilla; headaches attended to using the paperbark plant – possibly a healthier solution than the contemporary addiction to Paracetamol and Neurofen.

Whilst Pynor is an artist who investigates every aspect of her work – even her fluids are colour-coded to coalesce with the illness and its remedy – there is also a sense of sensuality – she is far more a floating alchemist than regal scientist. It is the body that she reaches out to touch, to perhaps cure, via the potent touch of her palette. Clearly she believes that art itself can be a cure for certain ailments and with their strangely calming washes punctuated by splashes of purple flowers or glistening green leaves these works do indeed have a soothing effect on the soul.

But Pynor also takes us full circle. With the death of a culture comes the death of a knowledge. And with the death of a species comes the death of a potential cure. The medicinal skills of the Dharawal – like the knowledge of so many indigenous cultures – are becoming increasingly rare realms of study and practice. Meanwhile, as the climate shudders around us, one plant species after another faces extinction, plants that in many cases have aided humanity for time immemorial. Perhaps these works argue for the invaluable nature of ancient lore, reflecting our universal amnesia for ways in which the body should inhabit its environment.

Australian born Helen Pynor attained a Doctor of Philosophy and a Bachelor of Visual Arts, at Sidney College of the Arts. She also attained a Bachelor of Sciences (Honours) at Macquarie University, Sydney. Recent major solo exhibitions include *Shadowbreath*, Linden-St Kilda Contemporary Arts Centre, Melbourne in 2005, Defence Artspace, Sydney 1996. *Milk*, Domink Mersch Gallery, Sydney, 2008. *Love Letter* Chez Robert Galerie, Web-based installation, France, 2008, curated by Michael Delacroix, red sea blue water 2007 and Swelling at Dianne Tanzer Gallery, Melbourne, 2009.

Group exhibitions include Sydney Alternative Art Australian High Commission, Singapore. In 2008, Pynor was a joint winner in the Josephine Ulrick and Win Schubert Photography Award, Gold Coast City Art Gallery and the 2009 Winner, Royal Bank of Scotland Emerging Artists Award. Pynor has been represented in the 2009 Hong Kong Art Fair.

NATURAL HISTORY OF THE ENIGMA

Eduardo Kac has over the past ten years developed a uniquely controversial career built on the challenges posed by his experimental practices largely revolving on transgenic art. Since the development of his GFP Bunny, *Kac has continued challenging ethical boundaries through a focus on plants. Here he introduces his "plantimal", a new hybridic creation.*

Text by **Eduardo Kac**

The central work in the *Natural History of the Enigma* series is a *plantimal*, a new life form I created and that I call "Edunia", a genetically-engineered flower that is a hybrid of myself and Petunia. The "Edunia" expresses my DNA exclusively in its red veins.

Developed between 2003 and 2008, and first exhibited from April 17 to June 21, 2009 at the Weisman Art Museum, [1] in Minneapolis, *Natural History of the Enigma* also encompasses a large-scale public sculpture, a print suite, photographs, and other works.

The new flower is a Petunia strain that I invented and produced through molecular biology. It is not found in nature. The Edunia has red veins on light pink petals and a gene of mine is expressed on every cell of its red veins, i.e., my gene produces a protein in the veins only [2]. The gene was isolated and sequenced from my blood. The petal pink background, against which the red veins are seen, is evocative of my own pinkish white skin tone. The result of this molecular manipulation is a bloom that creates the living image of human blood rushing through the veins of a flower.

The gene I selected is responsible for the identification of foreign bodies. In this work, it is precisely that which identifies and rejects the other that I integrate into the other, thus creating a new kind of self that is partially flower and partially human.

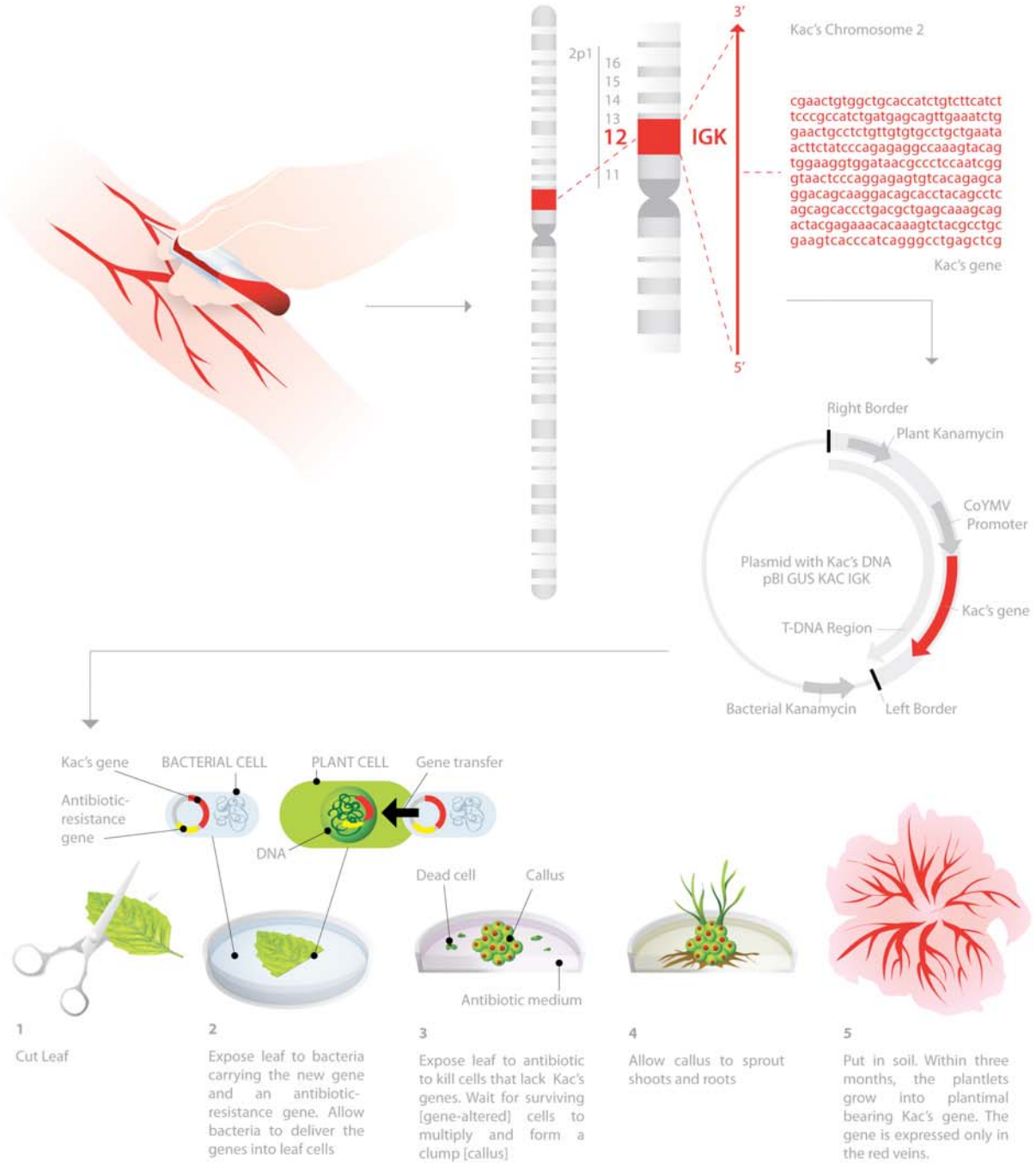
Natural History of the Enigma is a reflection on the contiguity of life between different species. It uses the redness of blood and the redness of the plant's veins as a marker of our shared heritage in the wider spectrum of life. By combining human and plant DNA in a new flower, in a visually dramatic way (red expression of human DNA in the flower veins), I bring forth the realization of the contiguity of life between different species.

This work seeks to instil in the public a sense of wonder about this most amazing of phenomena we call "life". The general public may have no difficulty in considering how close we truly are to apes and other non-human animals, particularly those with which it is possible to communicate directly, such as cats and dogs. However, the thought that we are also close to other life forms, including flora, will strike most as surprising.

While in the history of art one finds imaginative associations between

Eduardo Kac
The Natural History of the Enigma, photograph © Eduardo Kac

Eduardo Kac
The Making of Natural History of The Enigma
Edunia, transgenic flower expressing artist's own DNA in petal veins, 2008



Eduardo Kac
The Natural History of the Enigma, photograph © Eduardo Kac

anthropomorphic and botanical forms (as in the work of Archimboldo, for example), this parallel (between humans and plants) also belongs to the history of philosophy and to contemporary science. Advancing notions first articulated by Descartes, Julien Offray de La Mettrie (1709-1751) already proposed in his book *L'Homme Plante* [Man a Plant] (1748) that "the singular analogy between the plant and animal kingdoms has led me to the discovery that the principal parts of men and plants are the same." The preliminary sequencing of the human genome and that of a plant from the mustard family (Arabidopsis thaliana, in the journal Nature, December 14, 2000) have extended the artist's and the philosopher's analogies beyond their wildest dreams, into the deepest recesses of the human and plant cells. Both have revealed homologies between human and plant genetic sequences.

Thus, the key gesture of "Natural History of the Enigma" takes place at the molecular level. It is at once a physical realization (i.e., a new life created by an artist, *tout court*) and a symbolic gesture (i.e., ideas and emotions are evoked by the very existence of the flower).

In order to make "Edunia", I had a sample of my blood drawn and subsequently isolated a genetic sequence that is part of my immune system—the system that distinguishes self from non-self, i.e., protects against foreign molecules, disease, invaders – anything that is not me. To be more precise, I isolated a protein-coding sequence of my DNA from my Immunoglobulin (IgG) light chain (variable region) [3].

To create a petunia with red veins in which my blood gene is expressed I made a chimeric gene composed of my own DNA and a promoter to guide the red expression only in the flower vascular system. In order to make my blood-derived DNA express only in the red veins of the Petunia, I used Professor Neil Olszewski's CoYMV (Commelina Yellow Mottle Virus) Promoter, which drives gene expression only in plant veins. Professor Olszewski is in the Department of Plant Biology at the University of Minnesota, St. Paul, MN. [4]

My IgG DNA is integrated into the chromosome of the "Edunia". This means that every time that the "Edunia" is propagated through seeds my gene is present in the new flowers.

The sculpture that is part of *Natural History of the Enigma*, entitled "Singularis", is a three-dimensional fiberglass and metal form measuring 14'4" (height) x 20'4" (length) x 8' 5" (width.) It contrasts the minute scale of the molecular procedure with the larger-than-life structure. Likewise, the work pairs the ephemeral quality of the living organism with the permanence of the large sculpture. The sculpture is directly connected to the flower because its form is an enlargement of unique forms found inside this invented flower. In other words, the sculpture is derived from the molecular procedure employed to create the flower [5]. In its hybridity, the sculpture reveals the proximity of our next of kin in the kingdom Plantae.

I used 3D imaging and rapid-prototyping to visualize this fusion protein as a tangible form. I created the visual choreography of the sculpture based on the flower's molecular uniqueness. The sculpture was created with a vocabulary of organic twists and turns, helices, sheets and other three-dimensional features common to all life. The sculpture is blood red, in connection to the starting point of the work (my blood) and the veinal coloration of the "Edunia".

In anticipation of a future in which "Edunias" can be distributed socially and planted everywhere, I created a limited edition of "Edunia" seed packs containing actual "Edunia" seeds. In preparation for these seed packs, I made a set of six lithographs entitled "Edunia Seed Pack Studies".

The "Edunia Seed Packs" are hybrid objects that contain "Edunia" seeds. The embedded magnets keep the Seed Packs closed, while the viewer is invited to open them like books. In the text printed in the "Edunia Seed Packs", in addition to Growing Notes I provide information about Exposure and Bloom Period. I also address the viewer directly: "A prolific bloomer, the "Edunia" is free flowering in the garden and weather tolerant. It is an annual that will grow ten to fourteen inches (25-30 cm) high with 4-inch red-veined wavy-edged blossoms. Good timing and uniformity in flowering guaranteed!"

Completing the *Natural History of the Enigma* series there are watercolors and photographs. In the eight diptychs that constitute the "Mysterium Magnum" watercolors I explore a theme that has always been of interest to me: the inextricable relationship between life and communication. These watercolors oscillate between evoking biomorphic patterns and sign systems. The *plantimal* photographs were made directly from the first Edunias that germinated in Minneapolis in 2009. All "Edunias" featured in the photographs are genetically identical clones. Nevertheless, they all look quite different. The "plantimal" photographs allow me to point out that all life, no matter how similar, is fundamentally different. All life is singular.

Notes

1 - The exhibition was comprised of the actual Edunia, the complete "Edunia Seed Pack" set of six lithographs, and a limited edition of Edunia seed packs with actual Edunia seeds.

2 - The gene of mine I used is an IgG fragment extracted from my chromosome number 2. Immunoglobulin G (IgG) is a kind of protein that functions as an antibody. IgG is found in blood and other bodily fluids, and is used by the immune system to identify and neutralize foreign antigens. An antigen is a toxin or other foreign substance that provokes an immune response in the body, such as viruses, bacteria and allergens. More precisely, my DNA fragment is from my immunoglobulin kappa light chain (IGK). In "Natural History of the Enigma", the fusion protein, produced exclusively in the red veins, is a fusion of my IgG fragment with GUS (an enzyme that allowed me to confirm the vascular expression of the gene).

3 - For her assistance in drawing my blood, isolating my IgG and cloning it, I owe a debt of gratitude to Bonita L. Baskin, who was, at the time I carried out this work, the CEO of Apptec Laboratory Services, St. Paul, MN. The blood was drawn for "Natural History of the Enigma" on May 13th, 2004 in the premises of Apptec Laboratory Services.

4 - With the assistance of Professor Neil Olszewski, I obtained positive confirmation that my IgG protein was produced only in the Edunia veins by detecting the activity of the enzyme GUS (beta glucuronidase), which is fused to the IgG sequence. The detection was achieved through a staining technique.

5 - The sculpture's form is an invented protein composed of human and plant parts. The human part is a fragment of my Immunoglobulin (IgG) light chain (variable region). The plant component is from the Petunia's ANTHOCYANIN1 (AN1), responsible for red pigmentation in the flower. More precisely, AN1 is a transcription factor that controls genes encoding the enzymes that produce the red pigments.

Eduardo Kac
The Natural History of the Enigma, photograph ©
Eduardo Kac

Eduardo Kac was born in 1962 in Rio de Janeiro. He lives and works in Chicago. A pioneer of telecommunications art in the pre-Web 1980s, Eduardo Kac emerged in the early 1990s with his radical telepresence and biotelematic works. His visionary combination of robotics and networking explores the fluidity of subject positions in the post-digital world. His work deals with issues that range from the mythopoetics of online experience (Uirapuru) to the cultural impact of biotechnology (Genesis); from the changing condition of memory in the digital age (Time Capsule) to distributed collective agency (Teleporting an Unknown State); from the problematic notion of the ‹exotic› (Rara Avis) to the creation of life and evolution (GFP Bunny).

FLOWERS OF DECEIT

Heide Hatry' s challenging body of work reveals that The coexistence of beauty and ferocity can reveal there is holism in transforming the opposites
Text by **Heide Hatry**

My current project, which will be documented in the forthcoming book, *Flowers of Deceit*, began as an innocent question: why do flowers exert such a strong and immediate emotional impact on me and, I assume, many if not most others? Why do we find them so invigorating, so uplifting, calming, and consoling? In my somewhat perverse way, I immediately imagined a scenario that would undermine the normal relationship between human and flower, perceiver and perceived, at first as something of a personal thought experiment, but then as the basis for a more general exploration of aesthetic reception and the sociology/anthropology of beauty.

For some years, I have been working with biological materials, animal skin, flesh, and organs, to create art that addresses issues of personal identity, gender roles, appearance and reality, subject and object, the moral, ethical, and political dimensions of meat production and consumption, and a wide range of other topics. The idea of creating flowers out of animal offal was thus a quite natural extension of my work in that eccentric medium and what seemed to me to be a great way both to cut through the accretion of social determinants of aesthetic reception and to specifically thematize the ways in which codified expectations play a defining role in what we think of as beautiful. I rather think of the idea of beauty (and many other philosophical concepts) as having seemingly incompatible, but quite real, dimensions, similar in a way to the wave-particle duality in quantum mechanics. On the one hand, beauty is certainly a universal, and unitary, concept; on the other, it is a social construct, and one, which changes over time and place. It is utterly useless, and yet it everywhere seems to serve ulterior purposes. The doomed effort to compel these aspects to coincide, or to make one somehow exhaust the other, is at the basis of our distrust of the concept itself, when the very tension is what I believe sustains it. I thought it important from the outset of this project, therefore, to integrate a plurality of voices into the investigation, and I invited thinkers, researchers, and artists to address my question, which I felt was secretly the question of beauty itself, from as many informed perspectives as possible.

The flowers depicted in *Flowers of Deceit* are photographic documentations of sculptures composed mainly out of animal organs, disposed in different environments to which, the context suggests, they would be native. The photographs,

and I mean here the very fact that they are photographs as much as I do their specific merits, make the flowers appear to be "real," so real that it is quite difficult to see that they are, in fact, constructions, without having been provided with additional information. They are not composed as still-lives and have nothing to do with kitchens or butcher shops; they are not polemical, but are supposed merely to look like simple snapshots of flowers. They appear convincing, in part, as a consequence of visual habit and expectation.

The flowers with which we normally surround ourselves are dead detached sex organs from living things, bred explicitly to serve our pleasure, and not even our sustenance. The animal materials of which the sculptural flowers that are at the heart of the present collaboration undeniably derive from living creatures bred solely to die for our sustenance, but they are the "worthless" waste products of that process, that is, they serve no, or only an incidental, role in alimentation – lungs, hearts, stomachs, livers, tongues, bladders and, yes, sex organs as well. Yet their presence excites abhorrence while that of the former, joy.

In the course of working with these eccentric biological materials in my art in recent years I have become interested in the dynamic between perception and knowledge and aesthetic response. I've often observed objects or images that appear immediately appealing become repulsive to their viewer as knowledge of the materials of which they are constructed becomes clear. *Flowers of Deceit* is, therefore, both a more general exploration of the at once social and visceral dimensions of aesthetic response, and a quite personal voyage into the sources and meaning of my own fascination with natural forms and materials.

By "deconstructing," and reconstructing the flower – removing all of its potentially attractive elements (color, texture, vitality, smell...) other than the most basic forms (and even these often become mere allusions to naturally occurring forms) – I have tried to establish a non-prejudicial basis for investigation for my collaborators. Even the names of the flowers have been "scientized" (they are called by simple Latin names reflecting the materials of which they have been formed, for example, *aures porcinae* (pig ears)) so as to minimize even the effects of linguistic association. Of course, the question of historical, social or gender-specific substrates remains largely untouched by this method; it even prevails upon them for elements of the "deceit," and the extent to which they play roles in our response to "natural beauty" serve to animate and articulate the discussion. The contrast or tension or aporia created by looking upon something beautiful which is, in fact, for most viewers something repulsive, invokes numerous questions, which I hope will create a subtextual antiphon to the essays and which will occasionally erupt directly within them.

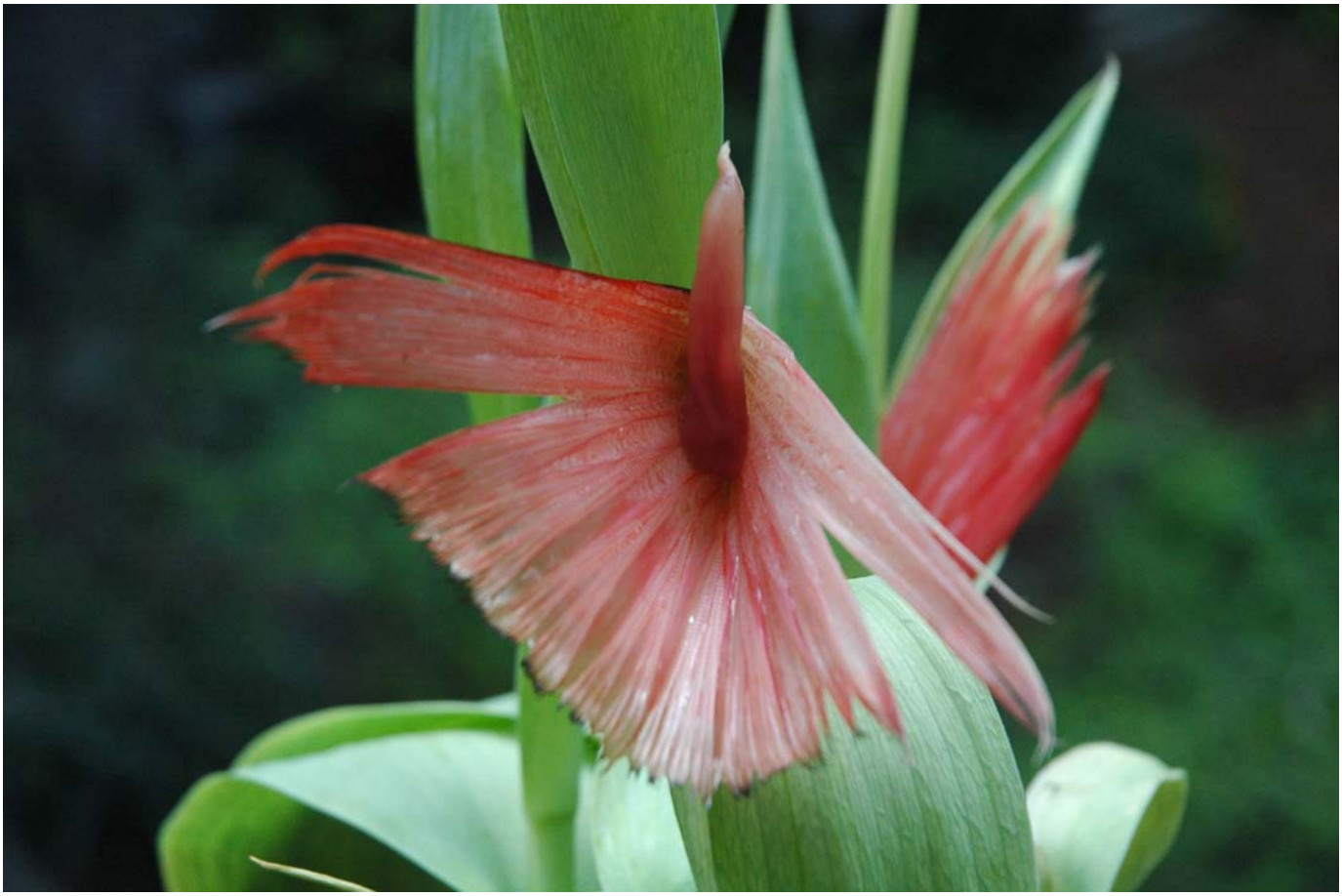
The biological purpose of even the demurest flower is seduction; its social function among humans is often that as well. And my flowers are also intended to seduce, but only to seduce the unthinking into thought and the thinking into imagining.

Among the more than eighty contributors to the project, who will approach my questions from a plurality of scientific and humane perspectives, are colleagues in the fields of anthropology, philosophy, psychology, sociology, philology, mathematics, botany, neuroscience, art history, gender studies, physics, chemistry, sensory studies, etc., as well as poets and writers, all using flowers broadly, and my own "Flowers of Evil" more specifically, as a locus for their thought. Contributors include Justin E.H. Smith, Avital Ronell, Lucy Lippard, Mary Caponegro, Claudia Benthien, Robert Kelly,…

The book will be published in January 2012 by Charta Art Books

Heide Hatry is a New York-based German neo-conceptual artist, curator and editor. Her work, often either body-related or employing animal flesh and organs (cf. bio-art), has aroused controversy and has been considered horrific, repulsive or sensationalist by some critics, while others have hailed her as an "imaginative provocateur", "a force of nature…, an artist and a humanist who is making a selfless contribution to life," and an artist whose works provoke a "reaction akin to having witnessed a murder." Her work bears conceptual (and material) similarities to that of Joseph Beuys, Damien Hirst, Dieter Roth, Jana Sterbak, and Louise Bourgeois.Hatry grew up on a farm in the outskirts of Holzgerlingen. She left home at the age of 15 to enroll in a sports school. Later she studied painting, printing, photography, and sculpture at various art schools including Akademie der Bildenden Künste in Stuttgart and Pädagogische Hochschule in Heidelberg, as well as art history at the University of Heidelberg. After many years teaching painting while working in the antiquarian book trade, she moved to New York in 2003 and began her career as a visual artist.

Heide Hatry
Aures porcinae, 2008, photograph © Heide Hatry



Heide Hatry
Venter taurinus cauda barbi gallinae and Branchialis pescis, 2010, photograph © Heide Hatry

Heide Hatry
Caudae ocelli pisces, 2011, photograph © Heide Hatry

Heide Hatry
Barbus rufus filamentosus piscis, 2010, photograph © Heide Hatry

FLORA

Mark Fairnington's practice is founded on painting as its primary method of research and explores an interest in the lineage of animal painting and its relation to the history of collecting within the natural sciences, probing the image of natural history specimens in collections, in storage and in displays. Here, Rob Stone discusses Fairnington's most recent body of work.

Text by **Rob Stone**

There is something about Idaho's State Capitol. It's not its architect or its date of construction that intrigues, necessarily. Sometimes such things can be deleted without real dismay. Nor is it the other, more comic intrigues of an emerging democracy that led to the choice of Boise over Lewiston as capital at the time of the founding of the state and the eventual commissioning of the building. It is not those things. It is its setting. Have a look. Viewed from some angles, the building seems alienating, mysterious and somehow surreal, in the way of de Chirico or Delvaux. Its architectural flora, its Corinthian capitals (acanthus: there's no suggestion of tobacco or corn here) affirm a crisply-educated, stoutly European attachment, not one with Washington. And, precisely because of that same affiliation, when viewed from other angles, the building appears itself alienated. Plucked from context and preserved. Planted against the imperious, reposing background of uncaring foothills to the northeast of the city, tasked with translating these foothills into a kind of Sienese cartography, the building seems at once potent and desperate. Firm, selfsure in its authorship of urbanity, it looks timid, buttoned and mannered in its encounter with the massiveness of even these most trivial Rockies, and their easy mastery of rising sunlight. And, because of its inability to learn from and to wear the insouciant gravity of this geography, Idaho's State Capitol is wretched; miserably scrutinizing any breath or gesture from the uninterested mountains that might be interpreted as a token; that it is loved by them, accepted, even admired by them. It's lovely really, and in just the same conditional way that the stiff resignation of a Henry James heroine has loveliness.

Like this, Boise's building represents an interface of creative yearning; at a place where raw and unaware nature meets with the socially erudite poetics of nature's depiction. Like this too, an exploration of a natura/naturans conundrum is the central theme of Fairnington and Rifkin's collaborative publication, *Flora*. *Flora,* as it happens, is not like this, not at all. It falls for none of this type of sombre romance, even though romance is its subject. If there could be any antithesis to the craven fumbling for mutual understanding articulated at Boise, *Flora* is it.

Mark Fairinington is an artist who has, over a considerable period, sustained a visual examination of the government and habits of speciation. Whether it be in his large-scale paintings of mounted insects, taxidermical displays of birds, portraits of prize stud stock or, as here, in the artistic and scientific language of botany, his interest is resolutely with the eccentricities of the one required to stand in for all; the specimen, the representative. In there, over this time, he has found a space where taxonomical requirements have emerged in relationship with artistic ones. For him the

Idaho's State Capitol , Boise, Idaho, US, 1912

improvisatory role of painting, its capacity to produce plausible visual knowledge in the process of taking one from this known thing to that. It is what makes this space and which, through its repeated exercise, allows his paintings to take on a collective form; a series of nuanced allegories on the imbricated condition of democracy and typology.

Sometimes, and importantly where it happens in this making of propinquity, only an alien character of connection is shown. Sometimes too, Fairnington allows that peculiarly characterized space to overtake. It is in a kind of Baldessarean gesture that visual, painterly, sense-making connections between this and that are deleted, producing conceptual spaces that are described in gold or black, or yellow, and the shades of nothing.

It is the cartography of these spaces that has caught Adrian Rifkin's intellectual imagination. Remarkable, if only for its formal technical accomplishment, and the way it is able to get ideas, as personae, on and off stage at the right time having said the right thing in the right order and in the right manner, Rifkin's essay does rather more than accompany, explain or parallel a series of Mark Fairnington's paintings. He takes seriously the proposal that, in the process of arranging, across a monochrome field, a portrait of a stuffed (yet personable) avian next to, say, a portrait of a eighteenth-century naturalist's illustration of an exotic plant, Fairnington has not so much engineered a pointlessly mysterious relation, rather he has subtracted some too obvious pre-existing relationship, suggesting that something banal be rethought. Like this, and in allowing a history of the inexistent as the content of these ostensibly empty fields, a ground appears between Fairnington and Rifkin. It is the ground of a thoroughly knowing conversation, though not one which is prepared to admit a knowing of each other. And, in accepting that sometimes things can be too strange to each other to be misunderstood, like this, it becomes possible to engage sensibly with whatever it is that regards us and conditions our democratic intentions.

So, whilst at Boise, democracy appears in the special language of architecturally realised flora straining to hear of its own value, its own justification. In *Flora*, it is the improbable manner of nature, its trickiness, that gives rise to the possibility of a conversation. This is a conversation in which allows a written text to explain some paintings, and, in an infrequently observed way, allows those paintings to inhabit and animate a text. Speculative, *Flora* is itself a kind of democracy.

Mark Fairnington has shown extensively in museums and private galleries in the United States and Europe, andis represented by Fred (London and Leipzig), Art Agentsand Peter Zimmermann in Germany. In 2000 he was the Sargant Fellow at the British School at Rome. In 1988 Faimington's exhibition Heavier Than Air at the Imperial War Museum, London followed a two-year residency to research the Museum's archive and collections. Since 2001 he has worked closely with the Natural History Museum, London and in 2002 undertook a field trip to their research station, Las Cuevas in Belize, which lies within a protected rainforest in the Maya Mountains. A major exhibition of Faimington's work, *Fabulous Beasts*, was mounted at the Museum in 2004. This show toured to the Kunsthalle Mannheim, Germany. Blumenstück Künstlers Glück at the Museum Morsbroichin Leverkusen in 2005 contextualised Faimington's work within a history of flower painting from the sixteenth century to the present day. Important exhibitions in 2007have included Bird Watching, in a former sixteenth-century covered fish market in the centre of Haarlem, and Bloedmoo, at the Historic Museum Rotterdam.

Mark Fairnington
Turaco Green Lady, oil and gold leaf on panel, 80x56 cm, 2011 © Mark Fairnington

Mark Fairnington
Dead Leaf Plant, oil on panel, 51x47 cm, 2011 © Mark Fairnington

Mark Fairnington
Cuckoo Moth, oil on panel, 80x60 cm, 2011 © Mark Fairnington

Mark Fairnington
Roadrunner Zygopetalum, oil on panel, 80x48 cm, 2011 © Mark Fairnington

LEAVES SYSTEMS: COMMUNICATING WITH PLANTS

In the realm of techno-art, the physical space, cyberspace and imaginary space are entangled. The flux of informational networks may be thought of as structural lines of an invisible field interconnecting elementary parts. Sensors, interfaces, organic and artificial bodies are physical and virtual nodes resonating in response to the system's dynamics. New digital technologies are shedding light on the space of interconnection between living systems and, in turn, between themselves and machines. Interactive art displaces our perception from the object to this interrelational field.

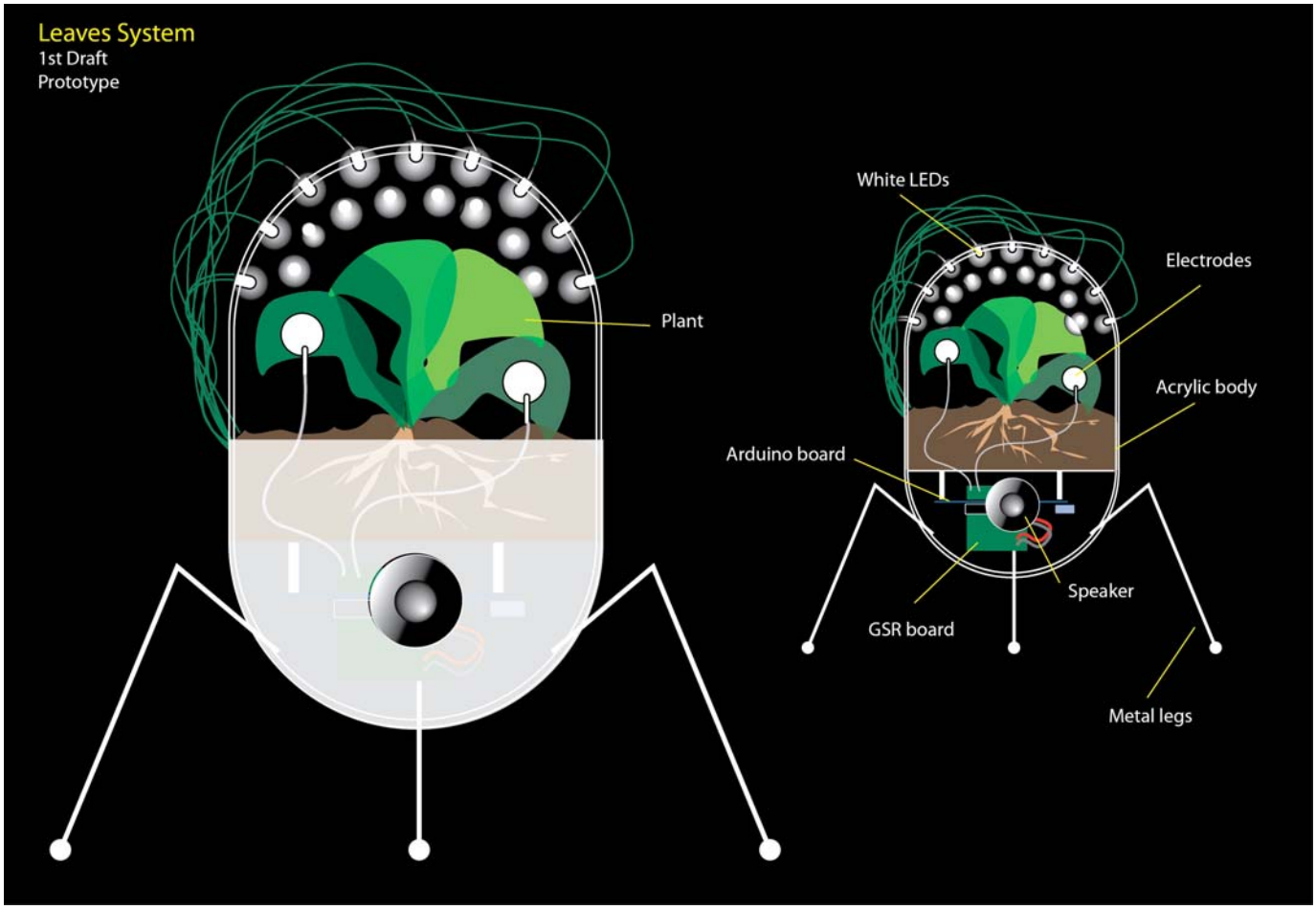
Text by Guto Nobrega

Leaves System is an interactive art project in biocommunication. The goal is to develop a dialogical (1) system in which plants have a fundamental role as sensitive agents. My research has been oriented by the cultural analysis of technology and the way it has hybridized with natural organisms, blurring the boundaries that delimit natural and artificial realm. We are so deeply immersed in technology, or technologies are so deep immersed in us, that numbers and molecules seem to be part of the same equation in life's function. Updating Roy Ascott's prediction (2000: 363), the future is already moist. The electronic age, nourished by the flow of electricity, has powered the art space, speeding up the earliest feedbacks of participatory art. Acceleration brought real time and, with it, the very possibility of interaction and communication. *Leaves System* takes advantage of such a condition to paradoxically investigate phenomena which seem to be governed by slower temporalities. This work uses physical computing to explore plants as biotransducers. The objective goal is to unbalance the equations of a telematic artwork opening up space for more subtle variables.

Why plants?

Plants have been around us since the very beginning of humanity, in fact they were on earth before us. They are living organisms but due to their apparent lack of movement we take then for granted. However, for more than one century it has been consistently argued that plants are in constant activity. *The Power of Movement in Plants*, published by Darwin in 1880, is a book where the author describes a hundred experiments he performed in numerous species of plants to demonstrate, through relatively simple procedure, that plant's movement is distinct from growth (2).

Nowadays, with the resource of digital cameras interval recording function it is easy to create time-lapse movies featuring plants in order to perceive these lively beings around us from new perspectives. It is like putting on new glasses to see nature properly. Nevertheless, what to say about sentience? Do plants feel? How do they respond to the environment? Brazilian popular culture feeds the belief that plants are instruments of protection and cure. *Sansevieria cylindrical*, known in Brazil by the popular name of *Espada de São Jorge,* is used by people to protect the house. "When arranged side by side it blocks negative energies", says the popular belief. *Ruta graveolens*, the scientific name of *Arruda* is considered efficient against envy. It is used for purification and defence. It is common to say about people that appreciate gardening that they are "green thumbed", meaning that such people are attuned to plants and vice-versa. But if



Guto Nóbrega
Leaves System, Scheme for the installation. Image by Guto Nóbrega. 2007 © Guto Nóbrega

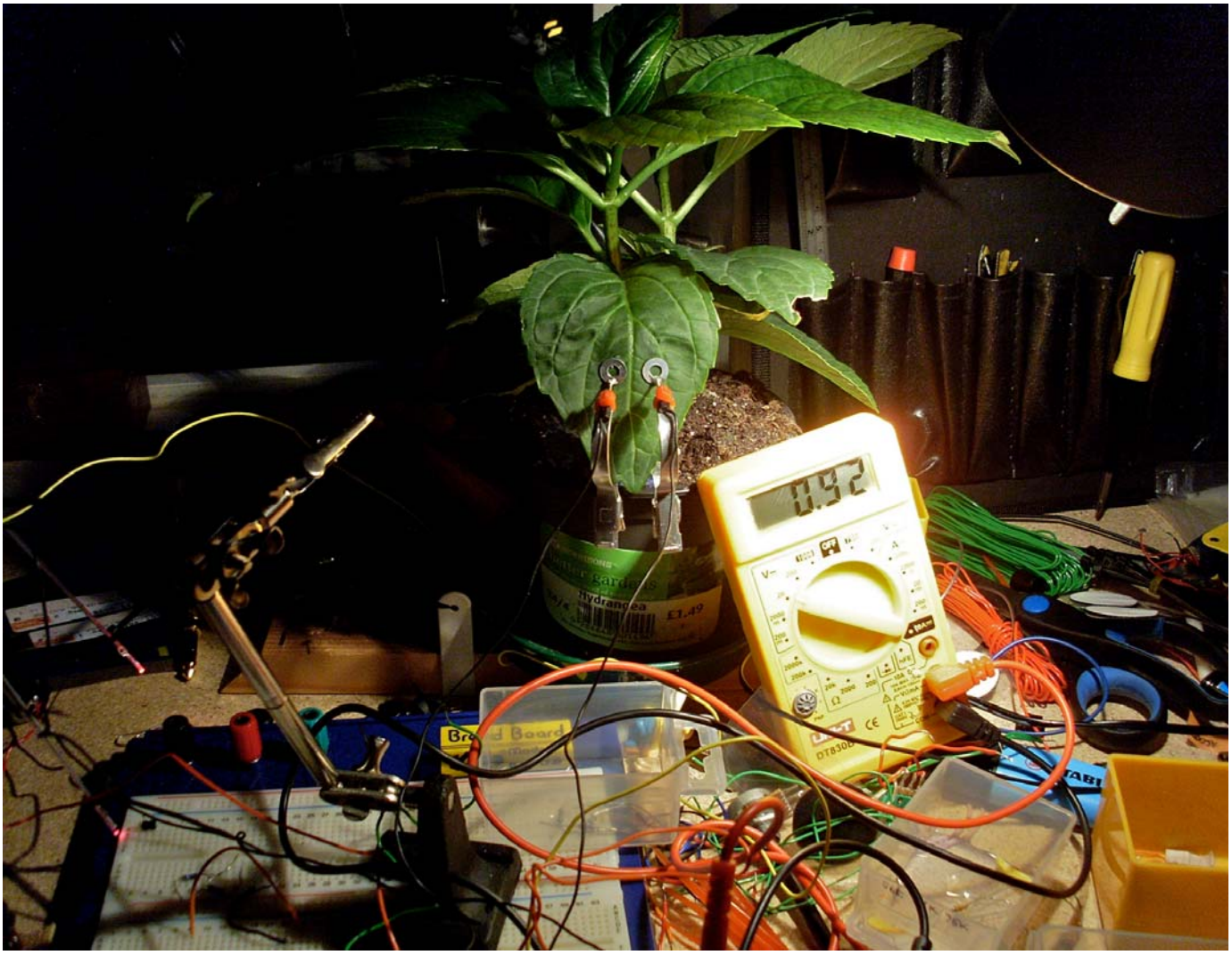
plants can feel, do they have a nervous system? What does science have to say about this? In order to map the epistemological base where *Leaves System functions*, it is worthwhile to examine the work of pioneering scientists on the field of plant physiology and beyond, and consider their far-reaching conclusions.

Sir Jagadish Chandra Bose (1858-1937) is considered the first Indian scientist to be recognized internationally. He achieved results on level rarely attained in physics, physiology vegetal and animal, and even psychology (Geddes, 1920). J. C. Bose was probably one of the first biophysicists "before biophysics exist as such" (Bischof, 2003). Intersecting distinct fields of research he anticipated in a hundred years currently interdisciplinary model of inquiring.

J. C. Bose was born in Mymensingh in Bengal (now in Bangladesh). He attended St. Xavier's, a Jesuit College in Calcutta and received his B.A diploma, which opened the doors to London, where he went to study medicine. For health reasons he was forced to stop his studies and decided to leave London and take science at Cambridge, where he was awarded a scholarship and graduated in natural science in 1884. Armed with good degrees Bose returned to Calcutta and was appointed Professor of Physics at Presidency College (Geddes, 1920: 28; Parry, 1997).

J. C. Bose's research career could be outlined in two main fields of inquiries: physics and plant physiology, with considerable contribution to both. His investigation on the former has started in 1884 and was centred around the work of the German physicist Heinrich Rudolf Hertz (1857-1894), who managed to produce electric waves, predicted mathematically by James Clerk Maxwell (1831–1879) twenty years before, and to demonstrate similar properties between electromagnetic and light waves. Hertz had used wavelength of 66cm, J. C. Bose, by his turn, carried out experiments at millimeter wavelength as short as 5 and 6mm (nowadays known as microwaves). In a small room converted into a laboratory in the Presidency College in Calcutta, he managed to produce experiments involving waveguides, horn antennas (3), dielectric lens, polarizes and semiconductors at frequency as high as 60GHz. J. C.. Bose performed investigation in wireless transmissions4 even before Marconi, improving the form of the "coherer", the first device used to detect radio signals in wireless telegraphy (5).

Working to refine the sensibility of his receivers he came across the phenomenon he

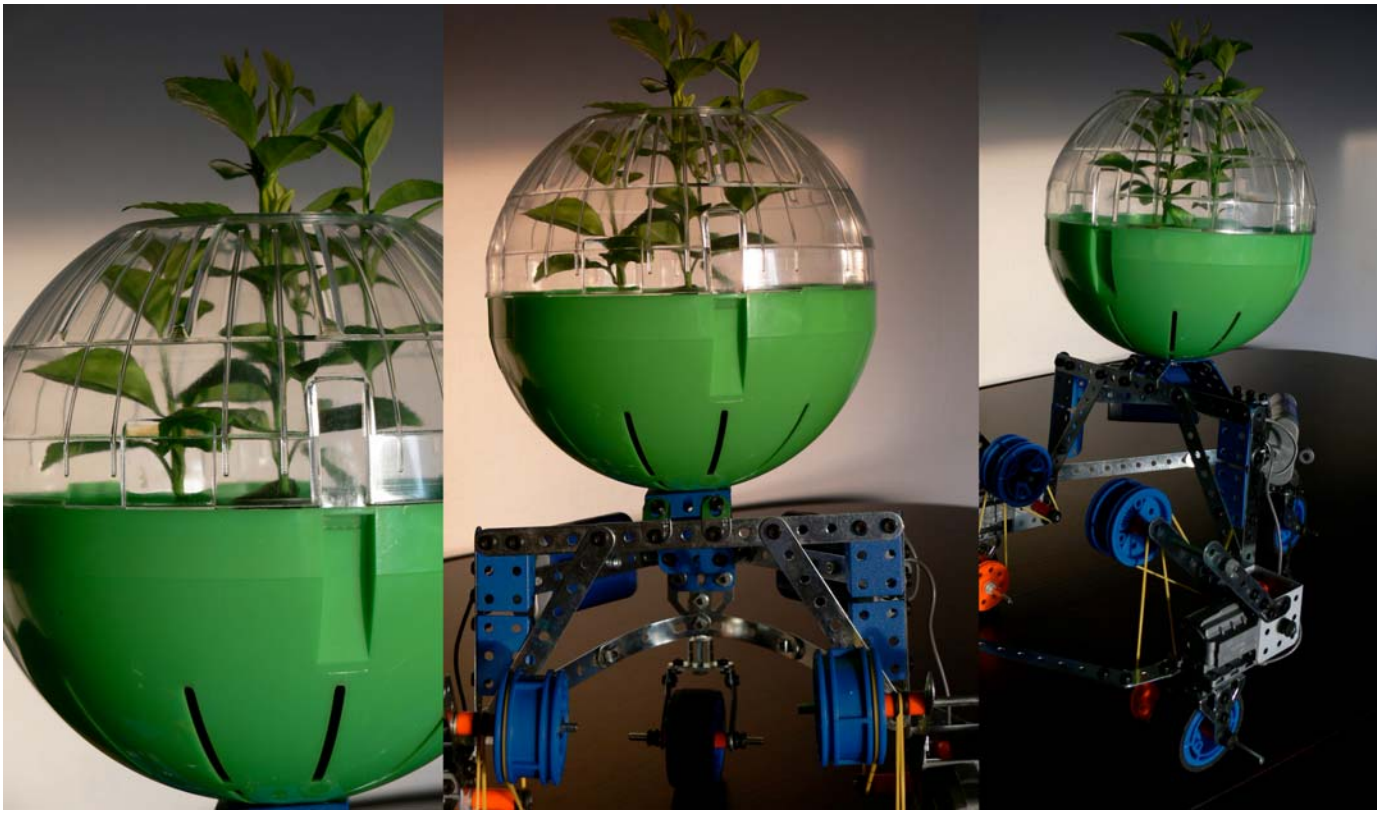


Guto Nóbrega
Leaves System, Testing plant electrophysiology. Image by Guto Nóbrega. 2007 © Guto Nóbrega

christened "electric touch" (Geddes, 1920: 72 - 82) or "contact-sensitiveness" by which he ruled that the molecular structure of all metals changed under electric radiation causing the material to present what he called "fatigue", today the well-known as mechanic fatigue of metals. Carrying out successive experiments conducted from 1900 to 1902 he showed that metal, animal muscles and even plants present similar reaction curves under effects of fatigue, stimulus or depressing, caused by electric waves or even poisons. It opened a newly-widened field of research6 that led J. C. Bose to investigate similarities between the behaviour of inorganic and organic matter. In a paper delivered at International Congress of Physics in Paris for the first timein science J. C. Bose "compares and compares the responses to the excitation of living tissues with those of inorganic matter" (Geddes, 1920: 88). Bose believed in continuity between the living and non-living. In his paper to the Congress he concluded:

> "It is difficult to draw a line and say, 'here the physical phenomenon ends and the physiological begins', or, 'that is a phenomenon of death matter, and this is a vital phenomenon peculiar to the living.' These lines of demarcation would be quite arbitrary." (Geddes, 1920: 80)

Gradually J. C. Bose was crossing over from the field of physics to biology. From 1903 onwards his research was completely devoted to plant physiology. His main inquiry focused on whether or not ordinary plants and their different organs were sensitive to mechanical or other kind of stimuli. At that time, it was best known among plant physiologists and even in popular culture that *Mimosa Pudica* responds by a sudden fall of the leaf, due to the contraction of the pulvinus, when being irritated. J. C. Bose noted that the contraction, despite being small, was magnified by the structure of a leaf-stalk. Thus, he wondered if such contraction would be present, but not perceivable, in ordinary plants. To test his hypothesis he worked on a magnifying device to



Guto Nóbrega
Leaves System, Prototype for the plantbot. Image by Guto Nóbrega. 2007 © Guto Nóbrega

attach in an ordinary plant and was rewarded by discovering that ordinary plants respond to stimulus by distinctive contraction. It was the beginning of J. C. Bose's investigation in plant response by method of measurements and registration. From this period onwards he developed many ingenious apparatuses to record mechanical and electrical response of plants to stimulus. "The Optical-Pulse Recorder", "The high Magnification Crescograph" or "Resonant Recorder", in association with galvanometric evaluation allowed him to achieve precise plots of very short time intervals, hence, enabling him to see beyond the boundaries of the prevailing theories in plant physiology of his time. He concluded that some sort of nervous mechanism, based in protoplasmic changes, as it occurs in animals, was present in plants (7), opposing the view that the transmission of excitation was due merely to movement of water in the plant.

After his death in 1937 some of his outstanding theories in plant cell became obscure but nowadays they appear to be revaluated by science.

> "He was the first to recognize the ubiquitous importance of electrical signaling between plant-cells in coordinating responses to the environment. He may have been the first to discover electrical 'pulsations' or oscillations in electric potentials and he proved that these were coupled with rhythmic movements in the telegraph plant Desmodium. Bose theorized that regular wave-like 'pulsations' in cell electric potential and turgor pressure were an endogenous form of cell signaling. He put forth a radical theory for the mechanism of the ascent of sap, based on electromechanical activities of living cells." (Shepherd, 1999)

Many scientific paradigms seem to last until the next generation of scientists open their eyes and minds to reframe of their research fields as guided by fresh perspectives. Nonetheless, for the sake of the scientific method many variables are still filtered out, many phenomena are neglect from the equations in the name of orthodoxy, even if the reasons are not so orthodox.

> "Until recently, the hegemony of plant biologists has been reluctant to view action potentials as of primary significance in plant responses. The principal reason for this was the discovery of the ubiquitous chemical signal auxin, *but socio-political factors, such as institutional nationalism,*

racism and sexism, and the use of plants in parapsychology, have contributed". (Shepherd, 1999)

Plants as sentient beings

Even if possessing some sort of nervous system, as claimed by J. C. Bose, plants don't have most of the physiological methods of perception, so-called five senses, as found in humans. Thus, to designate the phenomenon by which plants demonstrate to be attuned to the environment and other living things, Cleve Backster used the term primary perception. Backster's case is known by scientists, despite of being ignored by them or mostly of the time postulated as pseudoscience. At in the 1960's Cleve Backster, America's foremost lie-detector examiner became famous after an accidental experiment in biocommunication with a plant. In a nutshell, he was just trying to measure how long it would take for water put on the pot to reach the top leaves of his plant's office, a *Dracaena Cane,* but he was surprised when the instrument's chart recording showed traces resembling human response to emotional stimulation. So, he started to think about how to threaten the plant's well-being, probably influenced by his expertise as a trained lie-detector examiner, when he came across the idea of burning the plant's leaf.

> "… the imagery entered my mind of burning the leaf I was testing. I didn't verbalize, I didn't touch the plant, I didn't touch the equipment. The only new thing that could have been a stimulus for the plant was the mental image. Yet the plant went wild. The pen jumped right off the top of the chart. (…) From that split-second my consciousness hasn't been the same. My whole thought process, my whole priority system, has been devoted to looking into this." (Jensen, 1997)

From February 2, 1966 onwards he adjusted his routine as director of his school of lie detector to incorporate research in what he soon began to call primary perception. What followed from there was the transformation of his office into a modern scientific laboratory where he carried out a succession of systematic experiments in plant perception, extending his research to the level of cellular communication. A full account of his research can be found in his book *Primary Perception* (Backster,2003).

The scientific evaluation of Backster's work in biocommunication lies within the repeatability of his experiments. Some of the attempts in replicating his results have failed, but instead of advocating in favour or against Backster's cause, I would like to consider some points beyond the criteria of cause and effect present at scrutiny methods in science.

Backster's research doesn't seem to be concerned with whether or not plants and other living organisms are attuned to one another, or even the way they do such things. Let's remember that he "had never conceived of becoming involved with 'biocommunication', the cutting edge of consciousness research" (Backster, 2003: 11); he stumbled across this field by chance, and his awareness changed to accept his role since the very beginning. He touched on something that even he didn't know what it was and developed his own method of investigation from scratch.

The work of Backster is not limited to the field of plant physiology, but fits well into the issues of consciousness studies. It finds resonance on the work of Sheldrake (Sheldrake, 1999; Sheldrake and Pam, 2000), Pribram's theory of holographic brain (Pribram, 1969; Swanson, 2005) and even, at the base of plants and cells communication, some connections in relation to Alexander Gurwistch's experiment with onion roots, researched by myself elsewhere (Nóbrega, 2006), could be drawn .

The main criticism of Backster's work lies with repeatability. But he claims:

> "The events I've seen must be spontaneous. If you've thought them out in advance, you've already changed them. It all boils down to a very simple thing: repeatability and spontaneity do not go together, (…) There have been a few attempts by scientists to replicate my work with the brine shrimp [when he registered plant reaction to live shrimps fallen down in a boiling water in an automatized experiment], but these have all been methodologically inadequate. When they learned that they had to automate the experiment, they merely went to the other side of a wall, then, used closed-circuit television to watch what's going on. Clearly, they weren't removing their consciousness from the experiment. (Jensen, 1997)

Repeatability is tied to control, and control is a fundamental principle in Western science.

However it is important to observe the difference between automatism and control. While the former can be employed for the sake of creativity (surrealist automatism for instance), the latter restrains modes of operation. It is needed to find a balance. It is needed to find the direction on the creative control. I suppose that it is what art and technology is about.

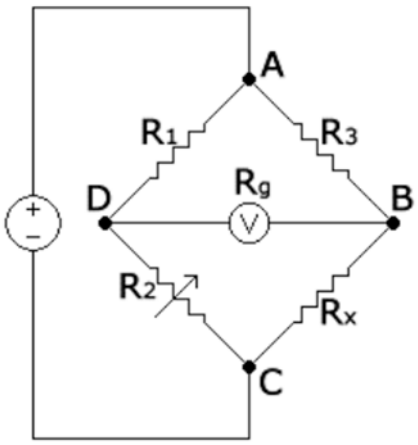
> "Although through science we strive for this total freedom, it may never been attained. Art, however, provides the means to win this freedom and to act it out – symbolically. In Art the will to control is expressed through processes of restricting experience and of creating in familiar relationships within a universe of visual discourse. In this way the Artist becomes a Free Man." (Ascott, 1966)

Leaves System

Leaves System is based on monitoring electro-conductivity of the plant's leaves and uses the data as variables to feed an interactive system. The main idea is to use the plants as organic sensor attuned to people and the environment. In order to do this I have adapted an electronic circuit designed by Lucas George Lawrence (8), published on *Popular Electronics* in June 1971. The core of the circuit is a Wheatstone bridge, a combination of four resistors as shown in the picture below. In such arrangement, if we keep the balance of two legs of a bridge circuit, meaning that the ratio of the two resistances in the leg (R2 / R1) is equal to the ratio of the two resistances in the leg (Rx / R3), then, the voltage between the two midpoints D and B will be zero10. However, considering Rx as a variable resistance it turns out that variations in the value of Rx will correspond to changes in the voltage between the points D and B. It is exactly what interests us in this instrumentation.

Replacing Rx by the plant leaf enables us to measure small variations of the leaf's electrical conductance. The plant will act as a biological variable resistor. So, small changes in the leaf's conductance will disrupt the balance of the bridge and will be readily detected by the appearance of an equivalent voltage between the points D and B.

Since the variation of voltage at D and B is on the order of millivolts the second stage of the Lawrence's circuit uses a general purpose operational amplifier to magnify this small voltage thousand times. It allows us to read an analogical signal as output, ranging between -5 and 5 volts.



This signal is the main source by which the dialogue with the plant will take place.

Objective and subjective sensing

The aim of *Leaves System* is to configure spaces of dialogue between humans and plants enhanced by a cybernetic environment. At the quantitative analysis domain is now undeniable the vital importance of electrical signal in plant response (Wildon et al., 1992; Shepherd, 1999). Variations in light, heat, moisture, barometric pressure, are some of the objective influences that affect the plant's behaviour and its electrophysiology. But it is proper for the art field to write between the lines, opening up questions to more subtle subjects.

Leaves System looks for subjective responses from its environment. It is not concerned with repeatability or predictability, but it is concerned with using the power of art experience to activate several levels of perception as possible. If we are interconnected by invisible forces that subtly interface us with other organisms, *Leaves System* seems to provide the adequate methodology to investigate such phenomenon. It counts with the time, dimension and metaphor of art language to promote the required immersion and to include on it the consciousness factor.

Architecture

With the aid of microcontroller (11) several possibilities of interfacing the plant are available. For *Leaves System* I am using Arduino, "an open-source physical computing platform based on a simple i/o (imput/output) board, and a development environment for writing Arduino software" (12). It permits the above described Wheatstone bridge to be connected at one of the

arduinno's analog inputs in such way that the plant of *Leaves System* will be able to control its own light, make sound and to move with the aid of robotic legs.

A prototype of *Leaves System* has been developed and the initial tests were made. Therefore, further research and assembling is necessary in order to implement the subsequent steps. Different plants have been tested and data logging is required for qualitative analysis. Later on the following possibilities are expected to be setup:

1- A collective system with plants emitting light and sound. The idea is to create a sort of cybernetic forest where the interaction between plants, humans and the environment could be enhanced by wiring subtle fields.

2- A *Leaves System* module built-in a microcontroller with enough capacity of data storage, so that it could be delivered in houses to people to take care of it. The system could record the interactions between the plant and its host. The chip would work as artificial memory for the plant.

3- Robotic Legs. Plants would be able to move itself around. The robot could be embedded with artificial intelligence in order to learn with the plant's behaviour. So, several layers of interface and communication would be in action. A triangulation defined by the robot, the plant and the viewer would demarcate a field of subtle interactions. Hopefully, plants as robotic brain could deliver to the machine some sort of awareness; maybe such as those seem in the realm of living thing.

Conclusion

Leaves System is an aesthetic experiment but also a methodological tool for practical investigation. It is part of theoretical research that seeks to investigate how it is possible to integrate new digital technologies in order to highlight subjective aspects of communication and interaction. It is also a way of inquiring whether or not it is possible to draw with the invisible lines that connect organisms to one another.

Notes

1 Dialogical in the same sense of the term dialogism as proposed by Eduardo Kac in reference to the work of art created with telematic media. As he states, such works are "communication events in which information flows in multiple directions. These events aim not to represent a transformation in the structure of communication but to create experience of it", and proposes "that new insights can be gained by examining artworks that are themselves real dialogues, that is, active forms of communication between two living entities." KAC, E. (2005), Telepresence and Bio Art: Networking Humans, Rabbits and Robots (Studies in Literature and Science). University of Michigan Press.

2 "Darwin accomplished this by attaching one end of a thin glass filament to a plant with a small bead of black wax or a small paper triangle attached to the other end of the filament. Several inches behind the plant, he placed a piece of paper on which he drew a small dot. He then placed a piece of glass several inches in front of the plant. By viewing the plant through the glass with one eye and moving his head until the wax ball was in the line of site with the dot on the paper, he could then mark a dot on the glass such that it was in line with the reference spot and the wax ball. He would then record the time next to the mark he just made. By observing the plant the same way at different times, it was possible to detect even very small movements by observing the displacement of the dots drawn on the glass. By changing the distance between the plant and the glass, it was possible to change the magnification of the movements. It is interesting to notice the aesthetical value of such method." HANGARTER, R. P. (2000), Darwin and his research on plant motion. Available at: http://plantsinmotion.bio.indiana.edu/plantmotion/projects/projects.html. Accessed on: 09/11/2006. It was probably one of the first drawings resulting from collaboration between a man and a plant.

3 A horn antenna is used for the transmission and reception of microwave signals.

4 In 1895, in a public lecture in Calcuta, he demonstrated the capacity of electric rays to travel from a room to another 75 feet away from the radiator. To perform its experiment he assembled a set of transmitter, antennae, receptors that could be considered the embryo of what would turn out to be the subsequent modern wireless telegraphy, developed by Oliver Lodged and Marconi.

5 "Its operation is based upon the large resistance offered to the passage of electric current by loose metal filings, which decreases under the influence of radio frequency alternating current." JENKINS, J. D. sparkmuseum. Available at: http://www.sparkmuseum.com/COHER.HTM. Accessed on: 11/11/2006.

6 His investigations in metal's molecular structure response to electric radiation led him to the question of "obtaining photography without the action of light". In 1901, enclosing in a light-tight box a section of a stem with a photographic plate and activating the assembled parts under the action of electromagnetic field, he had succeeded in producing a clear impression of the leaf structure on the photographic plate without intervention of light. It happens before 1939 when the Kirlian photo was developed by Semyon and Valentina Kirlian.

7 A full outline of Bose's theories and experiments on this subject is found on his book The Nervous Mechanism of Plants BOSE, S. J. C. (1926), Nervous Mechanism of Plants. London, New York, Toronto, Bombay, Calcutta an Madras, Longmans, Green and Co. LTD.

8 Lucas George Lawrence was an electronics specialist employed as an instrumentation engineer for a Los Angeles space-science corporation. He was involved in a project to develop jam-proof missile components and came across the idea that using plant's tissues as transducers would give the best results. He though "that living plant tissues or leaves were capable of simultaneously sensing temperature change, gravitational variation, electromagnetic fields, and a host of other environmental effects — an ability no known mechanical sensor possessed" THEROUX, M. Detecting Biodynamic Signals. Available at: http://www.borderlands.com/archives/arch/detectin.htm. Accessed on: 10/11/2006.. Is interesting to mention that his investigations conducted him to the work of Alexander Gurwitsh (1874-1954), a Russian embryologist that at 1920's introduced the concept of a "morphogenetic field" to biology, strongly suggesting the existence of a coherent activity of embryonic cells regulated by optical interference BELOUSSOV, L. V. & POPP, F.-A. (1995), Introductory remarks. IN BELOUSSOV, L. V. & POPP, F.-A. (Eds.), Biophotonics: non-equilibrium and coherent systems in biology, biophysics and biotechnology, 1994 Moscow, Bioinform Services Co. Russia.. This hypothesis was motivated by his discovery of an ultra-weak photon emission from living systems, of which he gave the name "mitogenetic radiation", due to the suspected connections between this bioluminescence and cell division rate. Based on the Gurwitsh's work and with the understanding of Cleve Backster's experiments with plants and polygraph, he started developing various

psychogalvanic analyzers to detect responses in plants.

9 Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. 10 (2006b), Wheatstone bridge. Available at: http://en.wikipedia.org/wiki/Wheatstone_Bridge. Accessed on: 09/10/2006

11 A microcontroller could be described as a small computer used to control electronic devices.

12 (2006a), Arduino. Available at: http://www.arduino.cc/. Accessed on: 09/10/2006.

Bibliography

(2006a), Arduino. Available at: http://www.arduino.cc/. Accessed on: 09/10/2006. (2006b), Wheatstone bridge. Available at: http://en.wikipedia.org/wiki/Wheatstone_Bridge. Accessed on: 09/10/2006.

ASCOTT, R. (1966), Statement from control. IN SHANKEN, E. A. (Ed.) Roy Ascott. Telematic Embrace: Visionary Theories of Art, Technology, and Consciousness. London, England, University of California Press, LTD.

ASCOTT, R. (2000), Arts Education @ the Edge of the Net: The Future Will Be Moist! IN SHANKEN, E. A. (Ed.) Roy Ascott. *Telematic Embrace: Visionary Theories of Art, Technology, and Consciousnes*s. London, England, University of California Press, LTD.

BACKSTER C, (2003), *Primary Perception: Biocommunication with Plants, Living Foods, and Human Cells*. California, White Rose Millennium Press.

BELOUSSOV, L. V. & POPP, F.-A. (1995), Introductory remarks. IN BELOUSSOV, L. V. & POPP, F.-A. (Eds.), Biophotonics: non-equilibrium and coherent systems in biology, biophysics and biotechnology, 1994 Moscow, Bioinform Services Co. Russia. Services Co. Russia. 10

BISCHOF, M. (2003), Introduction to Integrative Biophysics. IN POPP, F.-A. & BELOUSSOV, L. (Eds.) Integrative biophysics : biophotonics. Dordrecht ; London : Kluwer Academic.

BOSE, S. J. C. (1926), Nervous Mechanism of Plants. London, New York, Toronto, Bombay, Calcutta an Madras, Longmans, Green and Co. LTD.

DARWIN, C. R. (1880), The power of movement in plants. London, John Murray. Available at: http://www.biophotonik-international.de/biophotons.htm. Accessed on: 12/11/2006.

GEDDES, S. P. (1920), The life and work of Sir Jagadis C. Bose. London, Longmans.

HANGARTER, R. P. (2000), Darwin and his research on plant motion. Available at: http://plantsinmotion.bio.indiana.edu/plantmotion/projects/projects.html. Accessed on: 09/11/2006.

JENKINS, J. D. sparkmuseum. Available at: http://www.sparkmuseum.com/COHER.HTM. Accessed on: 11/11/2006.

JENSEN, D. (1997), The Plants Respond: An Interview with Cleve Backster. Available at: http://www.derrickjensen.org/backster.html. Accessed on: 03/11/2006.

KAC, E. (2005), Telepresence and Bio Art: Networking Humans, Rabbits and Robots (Studies in Literature and Science). University of Michigan Press.

NÓBREGA, C. (2006), Biophoton – The language of the cells. What can living systems tell us about interaction? Technoetic Arts, 4:3, p. 193-201.

PARRY, M. (Ed.) (1997), Chambers biographical dictionary Edinburgh, Chambers.

PRIBRAM, K. (1969), The Neurophysiology of Remembering. Physiological Psychology, 387 - 398.

SHELDRAKE, R. (1999), Dogs that knows when their masters are coming home.New York, Three Rivers Press.

SHELDRAKE, R. & PAM, S. (2000), A dog that seems to know when his owner is coming home: Videotaped experiments and observations. Journal of Scientific Exploration, 14, 233-255.

SHEPHERD, V. A. (1999), Bioelectricity and the rhythms of sensitive plants – The biophysical research of Jagadis Chandra Bose. Current Science. Available at: http://www.ias.ac.in/currsci/jul10/articles33.htm Accessed on: 03/11/06.

SWANSON, C. (2005), The Synchronized Universe: New Science of The Paranormal Tucson, AZ, Posedia Press.

THEROUX, M. Detecting Biodynamic Signals. Available at: http://www.borderlands.com/archives/arch/detectin.htm. Accessed on: 10/11/2006.

WILDON, D. C., THAIN, J. F., MINCHIN, P. E. H., GUBB, I. R., REILLY, A. J., SKIPPER, Y. D., DOHERTY, H. M. & BOWLES, P. J. O. D. D. J. (1992), Electrical signalling and systemic proteinase inhibitor induction in the wounded plant. Nature, 360, 62-65.
This paper was presented in 2007 at the The First Summit Meeting of the Planetary
Collegium - Montréal, Canada.

Acknowledgements

I would like to acknowledge CAPES/Brazil and Escola de Belas Artes – UFRJ for providing PhD fellowship and financial support.

Carlos (Guto) Nóbrega is Doctor of Philosophy by The Planetary Collegium programme (former CAiiA-STAR) based on the School of Art and Media, University of Plymouth – UK (2009), where he developed 4 years of research under supervision of Prof. Roy Ascott. His doctoral thesis, funded by CAPES – BRAZIL, is a transdisciplinary research in the fields of art, science, technology and nature in which he investigates how the confluence of these domains (specially in the last decades) has informed the creation of new aesthetics experiences. As a result of this study it was developed a theoretical-practical intervention in the field of arts with focus on the ideas of interactivity, telematics, field theories, and hyperorganisms. He has been developing series of artworks which encompasses drawings, photos, videos and robotics systems. He is artist and researcher with MA in Communication, Technology and Aesthetics by ECO-UFRJ - Brazil (2003) and is Bachelor in Engraving by the Escola de Belas Artes - UFRJ - Brazil (1998). Since 1995 he lectures at the UFRJBrazil where currently he holds a position as Adjunct Professor and coordinates the space NANO - Nucleous of Art and New Organisms, a research lab for exploring the intersection of art science and technology. His works have been presented widely in exhibitions and conferences such as: Arizona College of Fine Arts -Arizona US, ISEA Singapore, University of Quebec in Montreal s Coeur des Sciences, University of Applied Arts Vienna, Sala Parpalló – Valência Spain, LABoral – Centro de Arte y Creación Industrial, Gijon Spain, Facultad de Ciencias Sociais y Comunicación Universidad del País Vasco – Bilbao Spain, International Institute Of Biophysics Neuss Germany, Roland Levinsky Building, University of Plymouth UK, Art Centre Plymouth UK, Barbican Theatre Plymouth UK, Cornerhouse – Manchester UK.

UNRULY EDGES: MUSHROOMS AS COMPANION SPECIES

Although we are very aware that mushrooms are not plants, we have decided to bring this issue of Antennae to a close with a fantastic piece by Anna Tsing on this unusual subject. If discussing plants in the arts and humanities is avant-garde, then discussing mushrooms is, by comparison, really, really extreme.

Text by **Anna Tsing**

Domination, domestication, and love are deeply entangled. *Home* is where dependencies within and among species reach their most stifling. For all its hyped pleasure, perhaps this is not the best idea for multi-species life on earth. Consider, instead, the bounteous diversity of roadside margins. Consider mushrooms.

This essay is indebted to Donna Haraway not only for the concept of "companion species" but also for the permission she offers us all to be both scientist and cultural critic—that is, to refuse the boundaries that cordon nature from culture—and besides, to dare tell the history of the world in a single sentence, or certainly a short essay.[i] In this spirit, my essay begins with companionate experience and biology before moving to the history of domestication, European conquest, and the politically-and-biologically diverse potentials of the seams of global capitalism. These materials present a fungal argument against too avid an ideal of domestication, at least of women and plants.

Mushrooms in a multi-species landscape

Wandering and love of mushrooms engender each other. Walking is the speed of bodily pleasure and contemplation; it is also just the speed to look for mushrooms. After the rains, the air smells fresh with ozone, sap, and leaf litter, and my senses are alive with curiosity. What better than to encounter the orange folds of chanterelles pushing through the dark wet or the warm muffins of king boletes popping up through crumbly earth. The excitement of color, fragrance, and design —not to speak of pride to be the first to find them—well up. But of these delights the best, I think, are two: first, the undeserved bounty of the gift; and second, the offer of a *place* that will guide my future walks. These mushrooms are not the product of my labor, and because I have not toiled and worried over them, they jump into my hands with all the pleasures of the unasked for and the unexpected. For a moment, my tired load of guilt is absolved, and, like a lottery winner, I am alight with the sweetness of life itself. *Bismillah irachman irachim*.[ii]

Delight makes an impression: an impression of place. The very excitement of my senses commits to memory the suite of colors and scents, the angle of the light, the scratching briars, the solid placement of this tree, and the rise of the hill before me. Many times, wandering, I have suddenly remembered every stump and hollow of the spot on which I stood—through the mushrooms I once encountered there. Conscious decision can also take me to a spot of past encounters, for the best way to find mushrooms is always to return to the places you found them before. In many cases, the growing body (mycelium) that gives rise to mushrooms as its fruits lasts from season to season; besides, some mushroom growing bodies are life-long companions to particular trees. If you want to find chanterelles in central California, you must look

Mychorrhiza

under oaks—but not just any oak: You must look for *the* oak that lives with chanterelle mycelium, and you'll know it because you have seen the mushrooms there before. You visit the spot enough, and you know its seasonal flowers and its animal disturbances; you have made a familiar *place* in the landscape. Familiar places are the beginning of appreciation for multi-species interactions.

Foraging worked just this way for most of human history. To find a useful plant, animal, or fungus, foragers learned familiar places and returned to them again and again. High-powered rifles and fish-overstocking make it possible to succeed in killing something in a random pass through the countryside; but sportsmen still do better with a local guide. Through their familiar places, foragers learn not just about ecological relations in general, but also about the stochastic natural histories through which particular species and species associations happened to flourish in particular spots. The familiar places of foraging do not require territorial exclusivity; other beings—human and otherwise—learn them too. Their expansive and overlapping geographies resist common models, which divide the world into "your space" and "mine." Furthermore, foragers nurture *landscapes*—with their multiple residents and visitors—rather than single species. Familiar places engender forms of identification and companionship that contrast to hyper-domestication and private property as we know it. You who search for a world of mutually-flourishing companions, consider mushrooms.

Mushrooms are well known as companions. The concept of "symbiosis"—

mutually beneficial interspecies living—was invented for the lichen, an association of a fungus and an alga or cyanobacteria. The non-fungal partner fuels lichen metabolism through photosynthesis; the fungus makes it possible for the lichen to live in extreme conditions. Repeated cycles of wetting and drying do not faze the lichen, because the fungal partner can re-organize its membranes as soon as water appears, allowing photosynthesis to resume.[iii] Lichen may be found in frozen tundra and on parched desert rocks.

For mushroom lovers, the most intriguing interspecies companionship is that between fungi and plant roots. In *mycorrhiza*, the threads of the fungal body enter or sheathe the roots of plants. Indian pipes and other plants without chlorophyll are supported entirely from the nutrients they gain from fungi in their roots; many orchids cannot even germinate without fungalassistance.[iv] More generally, the fungus obtains sustenance from the plant while offering it minerals from the surrounding soil. Fungi can even bore into rocks, making their mineral elements available for plant growth. In the long history of the earth, fungi are responsible for enriching soil thus allowing plants to evolve; fungi channel minerals from rocks to plants.[v] Trees are able to grow on poor soils because of the fungi that bring their roots phosphorus, magnesium, calcium, and more. In the area I live, foresters inoculate the roots of the Douglas fir seedlings they plant with *Suillus* (slippery jack) to aid reforestation. Meanwhile, many of the most favored mushrooms of cuisine are mycorrhizal. In France, truffle farmers inoculate tree seedlings in fenced plots.[vi] But, of course, the fungi are perfectly capable of doing this work themselves—but with a more open geography. And so we mushroom-lovers wander, seeking the companionship of trees as well as mushrooms.

Fungi are not always benign in their interspecies associations.[vii] Fungi are dauntingly omnivorous in their carbon conversion habits. Various fungi subsist on live as well as dead animals and plants. Some are ferocious pathogens. (*Cryptococcus neoformans* kills many AIDS patients.[viii]) Some are irritating parasites. (Think of ringworm or athlete's foot.) Some slide through their hosts' intestines innocuously waiting to arrive in a pat of dung in which to flourish. Some fungi find totally unexpected substrates: *Cladosporium resinae*, originally found in tree resins, has found a taste for airplane fuel, causing blocked fuel lines.[ix] Some hurt one host while living happily with another: *Puccina graminis* bonds with the barberry bush and feeds flies with its nectar to produce the spores that will kill as they grow on wheat.[x] Fungal appetites are always ambivalent in their benevolence, depending on your point of view. The ability of fungi to degrade the cellulose and lignin of dead wood, so feared in protecting wooden houses, is also fungi's greatest gift to forest regeneration. Otherwise, the forest would be stacked with dead wood, and other organisms would have a smaller and smaller nutrient base. Meanwhile, the role of fungi in ecosystem renewal makes it more than obvious that fungi are always companions to other species. Species interdependence is a well-known fact—except when it comes to humans.

Human exceptionalism blinds us. Science has inherited stories about human mastery from the great monotheistic religions. These stories fuel assumptions about human autonomy, and they direct questions to the human *control* of nature, on the one hand, or human *impact* on nature, on the other, rather than to species interdependence.[xi] One of the many limitations of this heritage is that it has directed us to imagine human species being, that is, the practices of being a species, as autonomously self-maintaining—and therefore constant across culture and history. The idea of *human nature* has been given over to social conservatives and sociobiologists, who use assumptions of human constancy and autonomy to endorse the most autocratic and militaristic ideologies. What if we imagined a human nature that shifted historically together with varied webs of interspecies dependence? *Human nature is an interspecies relationship*. Far from challenging genetics, an interspecies frame for our species opens possibilities for biological as well as cultural research trajectories. We might understand more, for example, about the various webs of domestication in which we humans have entangled ourselves.

Domestication is ordinarily understood as human control over other species. That such relations might also change humans is generally ignored.[xii] Moreover, domestication tends to be imagined as a hard line: You are either in the human fold or you are out in the wild. Because this dichotomization stems from an ideological commitment to human mastery, it supports the most outrageous fantasies of domestic control, on the one hand, and wild species self-making, on the other. Through such fantasies, domestics are condemned to life imprisonment and genetic standardization, while wild species are "preserved" in gene banks while their multi-species landscapes are destroyed. Yet despite these extreme efforts, most species on both sides of the line—including humans—live in complex relations of dependency

Puccina graminis

and interdependence. Attention to this diversity can be the beginning of an appreciation of interspecies species being.

Fungi are indicator species for the human condition. Few fungi have found their way into human domestication schemes, and only a few of those—such as fungi used for industrial enzyme production—have had their genomes badly tampered with. (Supermarket button mushrooms are the same *Agaricus bisporus* as those growing in meadows.) Yet fungi are ubiquitous, and they follow all our human experiments and follies. Consider *Serpula lacrymans*, the dry rot fungus, once found only in the Himalayas.[xiii] Through their South Asian conquests, the British navy incorporated it into their ships. *S. lacrymans* flourished in the unseasoned woods often used in ships for naval campaigns, and thus it traveled around the world. By the early 19th century, the decay of wood in British naval ships was called a "national calamity," and panic ensued until the introduction of ironclad war ships in the 1860s.[xiv] Dry rot, however, just kept spreading, as the fungus found new homes in the damp basement beams and railroad ties of British-sponsored civilization. British expansion and dry rot moved together. As in this example, the presence of fungi often tell us of the changing practices of being human.

The domestication of humans is one place to begin.

The origin of the family, private property, and the state[xv]

Cereals domesticated humans. The love affair between people and cereals is one of the great romances of human history. One of its most extreme forms began some ten thousand years ago in the Near East, where people began to cultivate wheat and barley. In this nascent domestication, people transferred their affection from multi-species landscapes to shower intimacy upon one or two particular crops.[xvi]

The most curious thing about Near Eastern grain domestication is that through most of this area it has been perfectly easy to gather large quantities of wild wheat and barley without the hard work of cultivation. Even in the 1960s, large stands of wild grain made foraging simple.[xvii] The story we tell ourselves about the "convenience" and "efficiency" of growing crops at home is just not true; cultivation almost

Serpula lacrymans

everywhere requires more labor than foraging. There were probably many reasons—from religion to local scarcity—to try experiments in domestication; but what maintained and extended grain cultivation was the emergence of social hierarchies—and the rise of the state. Intensive cereal agriculture can do one thing better than other forms of subsistence: support elites. States institutionalize the confiscation of a share of the harvest. Across Eurasia, the rise of states and their specialized civilizations is associated with the spread of intensive cereal agriculture. In some places, states followed agriculture; in other places, agriculture followed states. In each case, states promoted agriculture through their symbols and armies. Sometimes they criminalized other forms of subsistence; only outlaws would refuse the gift of state fertility. And for those inside state heartlands, this gift of fertility could maintain itself, at least in good times, through love.[xviii]

The biological transformation of people and plants that accompanied intensive cereal agriculture is best understood, then, through the rising tide of hierarchical social arrangements—and the entanglement of the state. States encouraged sedentary, stable farms. States encouraged family-based households and guaranteed the forms of family property and inheritance that drew lines within and between families. The *pater familias* was the state's representative at the level of the working household; it is he who ensured that taxes and tithes would be drawn off the harvest for the subsistence of elites. It is within this political configuration that both women and grain were confined and managed to maximize fertility.[xix]

The grains selected through domestication had big, high-carbohydrate seeds; high carbohydrate diets allowed women to have more children. Instead of working to limit fertility, as most foragers do, people suddenly wanted as many children as possible—not only because of the fetish of fertility but also because the family needed more labor for the cereals. The cereals did not care whether family or non-family labor raised them, and there was no dearth of *people*; but state-supported *property* encouraged labor inside the family, i.e., children. Having lots of children was not just nature at work; not all animals work to maximize reproduction. Out-of-control and non-sustainable human reproduction is a feature of a particular human domestication: the love affair between people and cereal grains.

This obsession with reproduction in turn limited women's mobility and opportunities outside of childcare. For all its matriarchal possibilities, it seems fair to call this interspecies love affair, echoing Frederick Engels, "the world historical defeat of the female sex."[xx]

As farmers have intensified their efforts to feed larger and larger human populations, they have turned toward an ever-narrowing range of crops—and of family forms. Yet the standardization of crops and their human families has nowhere been complete. Wherever the power of the state attenuates, landscapes of greater biodiversity and greater social diversity continue to flourish. However, the idealized model of sedentary confinement has been powerful *in itself* in keeping margins marginal. During my research with shifting cultivators of Kalimantan, Indonesia, some women said of my wealth and privilege: "If I had what you have, my feet would never touch the ground." Women's confinement is the center of a beautiful dream of order and plenty.

Fungi are the enemy of monocrop farms and farmers. Since ancient states encouraged intensive agriculture, there have been many and varied pressures to standardize crops. Since the 19th century, scientific agriculture has surpassed the efforts of earlier domestications in standardizing crops; it has made standardization itself the "modern standard." [xxi] Today, only standardization allows farmers to market their crops. Yet standardization makes plants vulnerable to all kinds of disease, including fungal rusts and smuts; without the chance to develop resistant varieties, the crops may all go down at once. The emergence of vast fields of grain offered fungal plant parasites a field day—and a reputation as the enemy of civilization and, later, progress. As the cultivation of non-grain crops has been modeled on the ideals of intensive cereal agriculture, they too have succumbed to every sort of mold and blight: a warning to us all.

The most famous fungal catastrophe may be the Irish potato blight. Potatoes were grown in Ireland with monocrop zeal—but a zeal forged in the reverse image of state-led grain expansion. British colonization had driven Irish to the most marginal lands; military raids burned and confiscated grain crops; only underground tubers allowed Irish survival. By the late 18th century, potatoes had become the Irish staple. When politically motivated landlords opened new land for tenant cultivation, tiny farms proliferated. The resulting family tenants, supported by potatoes, married sooner and had more children. The human population grew from 5 to 8 million in fifty years, even as the economy staggered under colonial control, enforcing dependence on potatoes.[xxii] Monocultivation exacts a toll. Europeans had imported perhaps just two of the several thousand landraces of potatoes domesticated by South Americans.[xxiii] *Phytophthora infestans*, potato late blight, was first reported around 1835 as a local problem in England. The fungus slowly built up until the rainy, muggy summer of 1845, when suddenly every Irish plant was infected, as well as all the tubers in storage. Famine resulted; a million people starved, and perhaps two million immigrated to the United States.[xxiv]

As genetic manipulation and cloning have affected more and more crops, the fungal alarm sounds again and again. Consider the acacia plantations that our wise developers have thought could replace the tropical rainforests of Borneo: Grown from a single clone, they are uniformly susceptible to a heart rot that hollows out their centers.[xxv] Why anyone would think to grow them then is another story—and one that takes us to the dynamics of European conquest and expansion.

Plantations were the engine of European expansion. Plantations produced the wealth—and the modus operandi—that allowed Europeans to take over the world. We usually hear about superior technologies and resources; but it was the plantation system that made navies, science, and eventually industrialization possible. Plantations are ordered cropping systems worked by non-owners and arranged for expansion. Plantations deepen domestication, re-intensifying plant dependencies and forcing fertility. Borrowing from state-endorsed cereal agriculture, they invest everything in the superabundance of a single crop. But one ingredient is missing: They remove the love. Instead of the romance connecting people, plants, and places, European planters introduced cultivation through coercion.[xxvi] The plants were exotics; the labor was forced through slavery, indenture, and conquest. Only through extreme order and control could anything flourish in this way; but with hierarchy and managed antagonism in place, enormous profits (and complementary poverties) could be produced. Because plantations have shaped how contemporary agribusiness is organized, we tend to think of such arrangements as the only way to grow crops. But this arrangement had to be naturalized until we learned to take the alienation of people from their crops for granted.

Consider sugar cane, a key participant.

No one loves plantation sugar cane. Puerto Rican cane workers go out to "defend themselves" (*se defienden*) and "do battle" (*bregando*) with the cane.[xxvii] Yet between the 17th and the 19th centuries, sugar cane plantations produced much of the wealth that fueled European conquest and development. The cane was moved across the warm zones, redefining regions; and so too came owners, managers, and laborers.[xxviii] Slaves were sent from West Africa to the New World. Contracted coolie labor from India and China moved into the Pacific. Peasants were conquered and coerced in the Indies. And in forging a new antagonism to plantation plants, humans changed the very nature of species being. Elites entrenched their sense of autonomy from other species; they were masters not lovers of nonhuman beings, the species *Others* who came to define human self-making. But for planters this was only possible to the extent that human subspecies were formulated and enforced: Someone had to work the cane. Biology came to signify the difference between free *owners* and coerced *labor*. Colored people worked the cane; white people owned and managed it. No racial laws or ideals could stop miscegenation, but they could guarantee that only those of the white race could inherit property. Racial divisions were produced and reproduced in each dowered marriage and inheritance.[xxix]

From the first, fungi were there, ready for niches to fill. Fungi constrained smallholder sugar cane; after it is cut, cane must be processed immediately to avoid fungal fermentation. The huge scale of cane plantations, and their savage labor discipline, are in part a response to fears of fermentation, which inspire on-site, expensive mills—and the desire to keep them running continuously. Yet fungal fermentation turned out to be a gift to the planters. It didn't take Caribbean planters long to observe that molasses, a byproduct of sugar milling, suited ubiquitous local yeast spores and quickly changed to alcohol. Rum was born, and the deadly but profitable "triangle trades" proffered rum for more African slaves, and thus more sugar production, and thus more distillers and financers in England or New England. Long before sugar became an object and symbol of mass consumption (thus cementing the expectation of species-autonomous publics whose species-unrecognizeable foods mysteriously appeared from afar), fungally fermented rum made plantation sugar profitable—spreading it across the field of European conquest.[xxx]

At the edge of respectability, rum charged sea-faring masculinities in which trade became adventure. Fermentation thus detracted attention from the cruelty of shore-bound domestication, both human and nonhuman.

White women became agents of racial hygiene. By dividing us firmly into races, plantations remade human species being, the practice of being human. Racial separation—depending as it does on marriage and family organization—required additional transformations of gender. In the plantation zones, with their unsettled mixtures of native and foreign, free, bound, and enslaved, wild and tame, disease and plenty, things could so easily go awry. Here white women became responsible for maintaining the boundaries—of homes, families, species, and the white race. Tropical fungi were one small part of their problem; molds and infections could get out of hand. Keeping their homes free of mildew, mosquitoes, and miscegenation, white women in the tropics became models of species and subspecies alienation.[xxxi]

By the late 19th century, discourses of scientific hygiene and eugenics informed white women's species segregations. Pasteurian germ theory was tested and boosted in the tropics, where white-controlled spaces could be organized as laboratories, with microorganisms stopped at the border of white homes. White women were called to follow their husbands to the tropics to keep things clean.[xxxii] Re-imported to the metropole, such public and private hygiene charged class dichotomies, informing distinctions between those women Ehrenreich and English once contrasted as the "sick" and the "sickening."[xxxiii] Vulnerable upper class women became the angels of the house; poor women were blamed as the agents of infection. Both received renewed mandates to reproduce. Poor families needed more labor, particularly where child labor kept many adults alive.[xxxiv] Privileged families were charged with the advancement of the race; women must bear its heirs.

The boundaries of the home became the expected boundaries of love. With the fetishization of the home as a space of purity and interdependence, extra-domestic intimacies, whether within or between species, seemed archaic fantasies (the community, the small farmer) or passing affairs (feminism, animal rights). Outside the home, the domain of economic rationality and conflicting individual interests reigned. Moreover, this kind of family fetish reappeared in mid-20th century U.S. mass culture—and once again in our times now—as the United States assumed a global leadership that allowed it to draw from older regimes of colonial culture. Here love is just not expected outside

family walls. Within the family, other species can be accepted; pets are models for family devotion. But the model of the loving and beloved pet does not spread love; it holds it tight inside the family.

U.S. publics learn to imagine themselves as compassionate, moral people because they love their children and their pets. They learn that this love makes them "good people"—unlike terrorists, who only hate. They imagine that this love equips them to make decisions for the whole world; it creates a moral hierarchy in which American "goodness" is qualification for global leadership. Other peoples, and other species, are judged by their ability to live up to U.S. standards of domestic intimacy. If they are properly engaged with family love, they may deserve to live. Others risk becoming "collateral damage" in U.S. projects to improve the world; to eliminate them may be unfortunate but not "inhumane." Under this tutelage, our species being is realigned to stop Others at home's door.

Given the power and pervasiveness of this biosocial plan, it is amazing that a still-rich diversity of species and populations still exists on earth. But such richness can no longer be taken for granted.

Mushroom collecting in the seams of empire

Biological and social diversity huddle defensively in neglected margins. In urban jungles as well as rural backwaters, the jumble of diversity that imperial planners tend to consider excessive still teems. Small farms have consistently higher biological diversity than large, capital-intensive farms—and not just in their crops. Even soil fungi, and other microorganisms, prefer small farms.[xxxv] Despite the frantic pace of commercial genetics, evolutionary process in zones of neglect continues to produce more useful species and species interactions by many orders of magnitude. Fungi are representative. What can manage to flourish in the contamination of mines? Many mychorrizal mushrooms—from the dainty *Laccaria laccata* to the disturbing dead man's foot (*Pisolithus tinctorius*)—accumulate heavy metals, protecting their forest partners, the plants, from contamination.[xxxvi] New radioactive fungi have colonized the walls of the reactor room in the ruins at Chernobyl; should someone decide to sequester the radioactivity, such species will be needed.[xxxvii] Of course not all species development is benign, but only in the tumble of diversity is adaptation possible. Yet most everywhere a negative correlation exists between diversity and the intensity of capital investment and state control! For those who love diversity, perhaps a project of capital-and-state unmapping is required.

Such projects operate best in the obscurity they seek to spread. For work that intends publicity, we might undertake to know something of the point of view from disordered but productive edges—the seams of empire.

The mushrooms we eat congregate at edges. Fungi are ubiquitous, but edible and medicinal mushrooms only grow in a few places. Many favored mushrooms flourish in agrarian seams: between fields and forest, and at the margins of zones of cultivation. King boletes and chanterelles are forest- and trail-edge species; they like light even as they grow with trees. Others, such as the meadow mushroom, prefer grassy fallows. Such mushrooms are still good reminders of the pleasures of variety beyond the domestic. Meanwhile, many species are abundant in the forests and mountains that surround intensively agrarian valleys. Since ancient days, mushroom collectors have combed montane and forest edges of grain-fed kingdoms: in southwest China and adjoining Southeast Asia; in Korea; in Eastern Europe and the Eurasian north. In contemporary North America, immigrants from these agrarian margins are still most likely to collect mushrooms for the market. Meanwhile, the global mushroom market has distributed collecting around the world. The Japanese delicacy *matsutake* takes collectors not only to traditional Asian margins but also to mountain margins across the Pacific: British Columbia; the U.S. Northwest; the mountains of Oaxaca.

Commercial mushroom collecting allows us to see the seams of global capitalism. Not only are places differentiated and products specific; forms of knowledge and resource management are wildly divergent and only tentatively connected in the mushroom commodity chain. Southeast Asian families compete for territories in Oregon; Japanese connoisseurs develop regional hierarchies of taste. There is too much contingency and variation here to imagine a simple calculus of supply and demand. Immersion in this space does not remove one from the world of capital, class, and regulation. This is no place to search for utopia. Yet *noticing the seams* is a place to begin.[xxxviii]

In protected homes across the empire, humans have curled up in their armchairs with their pets and their species-simulated snacks to watch the destruction of the rest of the world on TV. It is hard to know whether any humans will

Pisolithus-tinctorius

survive such domestic dreams. Fungi are not taking a position. Even the hardy lichens are dying from air pollution and acid rain.[xxxix] When they take up radioactivity from nuclear accidents, they feed it to the reindeer, who in turn feed it to human herders.[xl] We can ignore them, or we can consider what they are telling us about the human condition.

Outside the house, between the forests and fields, bounty is not yet exhausted.

** Donna Haraway shared a most generous critical reading of this essay with me. Diane Gifford-Gonzalez, S. Eben Kirksey, and James Scott kindly commented on a draft. I have benefited from their readings. The mistakes are my own.*

References

[i] Donna Haraway. The Companion Species Manifesto: Dogs, People, and Significant Others. Chicago: Prickly Paradigm, 2003. Haraway expands the pet-lovers' term "companion animal" to speak about interspecies relationships.

[ii] In the name of God, the most bountiful and the most merciful.

[iii] D.H. Jennings and G. Lysek, Fungal Biology, second edition. Oxford: Bios Scientific Publishers, 1999, p. 75. Recent studies of interspecies mutualisms emphasize the active and strategic work of all involved species. For example, studies of nitrogen-fixing bacteria in the root nodules of soybeans show that soybeans discourage bacterial strains that deliver less nitrogen—by limiting their oxygen (E. Toby Kiers, Robert Rousseau, Stuart West, R. Ford Denison, 2003. "Host Sanctions and the Legume-Rhizobium Mutualism," Nature 425(4 September): 78-81).

[iv] Orchids were a fashion in 19th century botany; mycorrhizae were first appreciated by Western scientists when it was found that many orchids depend on fungal partners. G.C. Ainsworth, Introduction to the History of Mycology, Cambridge: Cambridge University Press, 1976, p. 102-4. Indian pipes: Clyde M. Christensen. 1965. The Molds and Man. Minneapolis: University of Minnesota Press, p. 50.

[v] Nicholas Money, Mr. Bloomfield's Orchard. Oxford: Oxford University Press, 2002, p. 60.

[vi] Ibid, p. 85.

[vii] The term fungi refers to a larger biological classification (a kingdom contrasted with plants and animals among others) of which mushrooms form one part. All mushrooms are fungi; not all fungi bear mushrooms.

[viii] Money, p. 25.

[ix] Jennings and Lysek, p. 67, 138.

[x] Money, p. 172-79.

[xi] An important exception to this generalization is the medical and ecological literature on human diseases and parasites, in which the co-existence of species is of central concern. Yet this exception underlines the problem. As long as the relevant other species are found—at least sometimes—inside the human body, we can study them in relations of co-habitation and dependency. If the other species is outside the human body, that is, part of the "environment" for humans, analysis suddenly switches to a discourse of human impact, management, and control.

[xii] Haraway's work on dogs is of course a key interruption (op. cit.).

[xiii] Jennings and Lysek, p. 138.

[xiv] Ainsworth, p. 90-93.

[xv] Engels' classic just-so story emphasizes the role of pastoralism in developing notions of private property; the first property, he argues, was in herds (Frederick Engles. The Origin of the Family, Private Property, and the State. New York: International Publishers, 1972). Notions of property used to regulate the reproduction of herds inspired male control of reproduction in human families, ushering in "the world historical defeat of the female sex." Feminist thinkers such as Eleanor Leacock and Evelyn Reed brought this classic back into circulation in the 1970s, where it entered lively discussions of the long history of social inequality, particularly in feminist anthropology. (See, for example, Rayna Reiter, ed. Toward an Anthropology of Women. New York: Monthly Review, 1975; Michelle Rosaldo and Louise Lamphere, eds. Woman, Culture, and Society. Stanford: Stanford University Press, 1974; Mona Etienne and Eleanor Leacock, eds. Women and Colonization: Anthropological Perspectives. New York: Praegor, 1980; Eleanor Leacock. "Introduction," Engels, Origin, op.cit., pp. 7-67.) By the mid 1980s, feminist anthropology had turned to the specificity of ethnographic research to learn more about the cultural construction of gender. While this has led to many important insights, it has also left the field of long-duree storytelling to misogynists, including sociobiologists, medical doctors, and s-f writers, most of whom are not well read in history and anthropology. Perhaps it is time for feminists to re-enter the fray.

[xvi] The transition from a focus on landscapes to a focus on crops may be long and incomplete: The management of multi-species landscapes to favor certain game or wild plants has often been a step toward crop domestication (Harold Brookfield. Exploring Agrodiversity. New York: Columbia University, 2001, pp. 64-69). Furthermore, a broad-spectrum multi-species foraging focus can itself be seen as a historical product. In the Near East, a shift toward gathering multiple small-grain grasses is associated with the 10,000 years before domestication (Ehud Weiss, Wilma Wetterstrom, Dani Nadel, and Ofer Bar-Yosef. "The Broad-Spectrum Revisited: Evidence from Plant Remains," Proccedings of the National Academic of Sciences, USA 101(26, June 29, 2004): 9551-9555). It is also not completely fair to imagine domestication as limiting farmers' attention to just one or two crops; Near Eastern domestications produced legumes, fiber crops, and green vegetables as well as several cereal grains. Some of these came to farmers' attention first as farm weeds, and they tended to retain a secondary status in field management. Wheat and barley established precedence and held pride of place in farmers' hearts.

[xvii] Crop scientist Jack Harlan tried the experiment of harvesting Near Eastern wild wheat, using a flint-bladed sickle modeled after ancient tools; he collected the equivalent of 1 kg of clean and highly nutritious grain per hour. Jack Harlan. Crops and Man. Madison, Wisconsin: American Society of Agronomy and Crop Science Society of America, 1975, pp. 12, 172.

[xviii] Richard O'Connor argues that intensive rice agriculture was the key element allowing successful state formation in mainland Southeast Asia ("Agricultural Change and Ethnic Succession in Southeast Asian States: A Case for a Regional Anthropology," The Journal of Asian Studies 54[4, 1995]: 968-96). Clifford Geertz's Negara (Princeton: Princeton University Press, 1980) illustrates the practical autonomy of intensive rice agriculture in pre-colonial Bali; state power did not mean control of irrigation arrangements, but rather of the aesthetic structure of power and love. I show how state expansion created grain-intensive landscapes in Southeast Asia in "Agrarian Allegories and Global Futures," in Paul Greenough and Anna Tsing, eds., Nature in the Global South, Duke University Press, 2003, pp. 124-69.

[xix] The ambiguous nature of this form of love is suggested by the fact that ancient Near East grain cultivators have been associated with the nearest approximation to a "matriarchal" religion that most historians can come up with. The fetishization of reproduction made fertile women icons of the sacred. Women's other potential talents may not, however, have been equally appreciated—and woe to the barren woman.

[xx] See footnote 15. It would be incorrect to imagine that the confinement of women associated with cereal agriculture initiated a time of ease for the female sex. On the contrary, the work of preparing crops—especially grain—for food or storage required ever-greater investments of female labor.

[xxi] Jan Douwe van der Ploeg describes the starting point of modern crop science as an "ideal plant type." This ideal sets a standard of superiority, organizes breeding, and requires remaking the entire agricultural operation to fit its requirements. Van der Ploeg contrasts the science of potato standardization with local knowledge about potatoes in the Andes, which allows heterogeneity. ("Potatoes and Knowledge," In Mark Hobart, ed. An Anthropological Critique of Development, London: Routlege, 1993, pp. 209-27).

[xxii] Redcliffe Salaman, The History and Social Influence of the Potato. Cambridge: Cambridge University Press, 1985 [1949], Chapters XI-XVI.

[xxiii] Salaman, Chapter X, reports on European imports and the varieties developed from them. After the Irish famine, new varieties multiplied as European breeders sought resistance. However, the goal has always been to find the one best variety rather than to encourage diversity in the field. In contrast, Jonathan Sauer (Historical Geography of Crop Plants, Boca Raton: CRC Press, 1993, p. 145-55) discusses South American cultivars. Noting the still-large varietal diversity of subsistence farming, he writes, "A village may have over 100 clones with names recognized throughout the village" (p.148). On potato late blight, he comments, "Like other successful parasites, the fungus is apparently not usually lethal where it and its hosts have long coexisted. The blight was recognized as a problem in South America only after development of commercial potato monoculture, e.g., in Chile and Peru about 1950." (p. 152).

[xxiv] The blight affected all of Europe, but only Ireland was devastated because only Ireland was completely dependent on potatoes. See Salaman, Chapter XVI. For the biology of blight: Jennings and Lysek, p. 136; Money, p. 184-86; Christensen, p. 98-103.

[xxv] Harold Brookfield, Leslie Potter, and Yvonne Byron. In Place of the Forest: Environmental and Socioeconomic Transformations in Borneo and the Eastern Malay Penninsula. New York, United Nations Press, 1995, p. 105.

[xxvi] The European-sponsored plantation system also wrested the force of agricultural expansion and control away from states for the interests of capital, thus establishing the first context for the political hegemony of capital. This was a long and messy process, and most histories of the imperial world from the 16th through the 19th century are filled with the arguments among planters, mercantilists, slavers, colonial administrators, and proponents of "free trade" through which this shift was torturously negotiated. Increasingly, profit rather than state-making became the goal of agricultural development.

[xxvii] Sidney Mintz. Worker in the Cane. New York: W.W. Norton and Co., 1974, p.16. In contrast to plantation battles, sugar cane in a smallholder economy is an object of love. In upland Southeast Asia, for example, cane is a sweet refreshment, not a race to the refinery. Human-cane antagonism is not inherent in the nature of cane plants.

[xxviii] Sauer, pp. 236-50, traces the global travels of humans and non-humans in the history of cane cultivation. New geographies of cane types as well as human types were formed. Fungal pests were important participants in this travel; in 1882, for example, "red rot" was introduced to West Indian plantations from a case of sample cane sent from Mauritius (J.H. Galloway, The Sugar Cane Industry, Cambridge: Cambridge University Press, 1989, p. 141).

[xxix] Verena [Stolcke] Martinez-Alier details how such a system was developed in Cuba in response to the 18th-century sugar boom that multiplied the fortunes of planters and brought large numbers of slaves to the island. Race, she argues, came to stand for the plantation division of labor in 19th century Cuba. Verena Martinez-Alier. Marriage, Class, and Colour in Nineteenth-Century Cuba. Ann Arbor: University of Michigan Press, 1989.

[xxx] Sidney Mintz traces the history of sugar, showing how it became an object of general consumption in England only in the 18th century—well after the rum-oiled "triangle trades" were established. He also shows how Caribbean sugar plantations formed a proto-industrial labor model that shaped nascent industrialization in Europe with its social forms as well as its wealth. Sidney Mintz, Sweetness and Power: The Place of Sugar in Modern History. New York: Penguin Books, 1985.

[xxxi] As "the tropics" became defined in relation to problems of medical and racial hygiene, white women were asked to play a larger role in maintaining healthy families—and the white race. David Arnold (The Problem of Nature: Environment, Culture and European Expansion, Oxford: Blackwell, 1996) discusses the colonial formation of the tropics. Ann Stoler shows how the transformation of gender was key to emergent ideologies of race and medicine (Carnal Knowledge and Imperial Power: Race and the Intimate in Colonial Rule. Berkeley: University of California Press, 2002).

[xxxii] As Bruno Latour explains, the main problem for showing the importance of Pasteurian germ theory was the necessity of creating laboratory-like hygienic conditions in which people and their domesticates could be kept away from the generally ubiquitous environment of disease microorganisms. Latour suggests that colonial armies in the tropics—where disease ran rampant, limiting colonial conquest—were the first living laboratories for Pasteurian medicine (The Pasteurization of France. Trans. Alan Sheridan and John Law. Cambridge: Harvard University Press, 1986). Warwick Anderson discusses the application of hygienic theories in governing the colonial tropics ("The Natures of Culture: Environment and Race in the Colonial Tropics," In Greenough and Tsing, eds., op. cit.). Ann Stoler (op. cit.) shows the centrality of the importation of white women to the tropics to the new eugenics of the late colonial period.

[xxxiii] Barbara Ehrenreich and Dierdre English. 1973. Complaints and Disorders: The Sexual Politics of Sickness. Old Westbury, NY: The Feminist Press.

[xxxiv] In the peasant-worked sugar cane plantations of the Netherlands East Indies, for example, families needed labor for both subsistence rice production and colonially mandated cane labor. Family size quickly boomed in response to these colonial labor demands. There were plenty of people, but because families were units of corvee labor, every family needed their own. Child labor often supported the whole family. Benjamin White summarizes his research and that of others on this question in "'Agricultural Involution' and its Critics: Twenty Years After," Bulletin of Concerned Asian Scholars 15(2): 18-31, 1982. Nineteenth-century population booms across the colonial south need to be considered in relation to plantation exactments.

[xxxv] John Vandermeer and Ivette Perfecto, 1995. Breakfast of Biodiversity: The Truth about Rain Forest Destruction. Oakland: Institute for Food and Development Policy.

[xxxvi] John Dighton, 2003. Fungi in Ecosystem Processes. New York: Marcel Dekker, pp. 323-39.

[xxxvii] Ibid., pp. 350-51. Some fungi have developed "radiotropism": They direct their growth to sources of radioactivity!

[xxxviii] Anna Tsing, Friction: An Ethnography of Global Connection. Princeton: Princeton University Press, 2005.

[xxxix] Dighton, Fungi, op. cit. p. 322.

[xl] Ibid., p. 352-53.

Dr. Anna Tsing, Professor of Anthropology at University of California Santa Cruz, is the 2010 Phi Beta Kappa Lecturer. Author of several prize-winning books, her presentation about the cultural and biological role and evolution of the matsutake mushroom will cross disciplinary boundaries including anthropology, international political economy, biology, and history.

THE URPFLANZE SUPPLEMENT

by artist Melanie Jackson and writer Esther Leslie

The Urpflanze – *or the primal/primordial plant - is Goethe's imaginary plant that contains coiled up within it, the potential to generate all possible future forms. Their investigation takes them to behold scientific research from plant fossils to synthetic biology, and the economy of the material. Drawing on the intimacies of knowledge at the nanoscale to the spectre of gargantuan monstrosities, there is an intrigue in the primordial to the yet-to-be-created. There is a fascination in commodity production and ways in which natural forms and processes are harboured and mirrored by science and consumer capitalism, and the spectres of salvation and extinction that hover around them.*

Melanie Jackson is a Lecturer at the Slade School of Fine Art and Esther Leslie is Professor of Political Aesthetics at Birkbeck. The newspaper was also printed as a hardcopy edition of 10,000 with the exhibition by Melanie Jackson the Urpflanze (Part 1) at The Drawing Room, London in 2010 (funded by ACE). The Urpflanze (Part 2) *will be an animated film essay commissioned by arts catalyst with animate projects for exhibition and online broadcast in 2012 .*

Please download our supplement, The Urplanze *from Antennae's website: www.antennae.org.uk*

Antennae.org.uk

Issue nineteen will be
online on the 21st of December 2011