

## **“You Are Variations”: Questioning Environmental Encounter**

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*How do we encounter the environment?*

*Under what conditions, and through what forms of knowledge do we experience the world around us?*

*What are the limitations of our normative ways of knowing, what forms of intimacy with the organic other do they suggest, enable, and disable?*

Meet *Anlus glutinosa*, *Carpinus betulus*, *Acer pseudoplatanus* and *Pinus sylvestris*, four common tree species that populate our European landscapes. Christina Della Giustina’s *you are variations* invites you to encounter these trees, but also asks you to question the terms upon which you do so. For Della Giustina is an artist who calls us toward some pressing questions. She may have started out with the research problem: “How do changes in climatic conditions modify water cycle and water variability in trees?” But, it is broader, epistemological questions, like those listed above, that are poetically posed by the multi-media installations and performances that constitute *you are variations*. These are queries with enormous relevance for contemporary regimes of scientific knowledge, especially those concerned with climate futures. For, this is in an age in which the responsibilities of Environmental Scientists have never been higher, as they are required not only to produce knowledge, but also scrutinize it, and convey it to us – the general public – in a compelling manner. Entangled then with Della Giustina’s epistemological probing – what is knowledge? How do we understand? – are further questions that speak to a common querying across the disciplines concerning our ways of “being” in the world, examining what form environmentally sensitive ways of “being” might take.

The multisensory experience of the audio, video and light installations, performances and artists books that constitute *you are variations*, are importantly not just a presentation of environmental encounters, but a questioning of their terms. The explorations of trees that the installations and performances stage for our consumption are not just in-the-moment experiences, but rather set in motion the question of “how is it that we encounter the environment?” Della Giustina’s work is less, however, about providing an answer to that question, about promoting one way of knowing and being in the environment –scientific say– above another, and rather more about gently probing the meeting points and fault-lines of a whole series of different knowledge forms. The environmental encounters the Della Giustina stages for us do not easily settle out into

accepted ways of naming and knowing a tree: as knowledge forms – scientific, aesthetic – oscillate throughout the work, meeting and merging in performances and installations, before fracturing apart again. What is set in motion is a relationship between these knowledge forms that calls upon us to query their differences and similarities. This is not so much to undermine or critique these modes of exploration, but rather to interleave them, and in doing so to produce the possibilities of something maybe new, maybe different.

In this short essay I want therefore to explore how *you are variations* draws together the aesthetic and the scientific, interweaving the two to explore the epistemological boarderlands of environmental science. The work pushes gently at the latter's visual economies, drawing on the resources of arts practices to suggest how inter-species intimacies might be formed that enable us to know otherwise, to encounter differently. I want, in short, to examine Della Giustina's works as epistemological explorations, and as reflections on the forms of encounter with organisms that populate environmental science. Her process, as I shall explore was a performative one, a situated artistic occupation of, some might say intervention in, a laboratory environment. In the process of her situated explorations of the embodied practices and habitual discourses of scientific production she pressed at the limits of these ways of knowing, tested the firmness of boundaries between their practice and hers, seeking at times to dissolve them. Realizing, in the process, forms of encounter – of embrace – of both scientists, and of trees, that was undoubtedly challenging, but also brimming with possibility. I begin by exploring the situated production of *you are variations*, before focusing on its visual and sonic elements in turn, I will conclude by thinking through possibilities for environmental encounters that *you are variations* opens out.

### **I. Situating Production:**

*This is not a straight line            this is the beginning of a circle            the beginning of embracing<sup>i</sup>*

Building on her previous explorations of sound and the hydrological cycle Della Giustina conceived and developed *you are variations* during the course of a nine month residency (March-December 2011) at the Federal Institute for Forest, Snow and Landscape research WSL, Birmensdorf, Switzerland. Convened as part of the Swiss Artists in Labs

programme the residency afforded Della Giustina first-hand access to a series of resources.<sup>ii</sup> She was able to access field and lab working practices, to work in the context of a research group, and to explore the knowledge bases of these environmental scientists and their decades of climatic and eco-physiological data on trees taken from sites across Switzerland. *You are variations* took place not only in the context of such situated scientific production – the localised social context of the lab – but also against the backdrop of global concerns with the observable trends in climate change, and the related known and unknown modifications in the water cycle both globally and in a micro-climatic context.<sup>iii</sup>

Over time Della Giustina came to focus on a small handful of tree species – *Anulus glutinosa*, *Carpinus betulus*, *Acer pseudoplatanus* and *Pinus sylvestris* – and two scientific sites, Visp in the Valais region of Switzerland and Vorderwald on the Swiss Plateau. Representing different ecosystems – dry alpine and wet midland respectively – these two sites provided years of scientific data for comparison, data that Della Giustina was to transpose into visual and sound-scapes, thus rendering the differences in water availability and plant responses to climatic change into a very different register. These data are of significance in both the Swiss, but also the global climate change story. WSL is known world-wide in scientific communities for its long term monitoring programme (LWF). The programme involves the collection and continuous analysis of data from a series of sites around Switzerland with a record at some sites going back centuries. Working with the “Forest Dynamics” and the “Forest, Soil and Biogeochemistry” research groups, enabled Della Giustina to conduct both field and laboratory explorations of these environmental data sets, collating and analyzing information on soil moisture, sap-flow, leaf gas exchange and meteorological conditions. This allowed her to explore the tree-water system, including modeling water flux through soil, examining molecular changes as it passes into root cells, and stem vessels and as the water evaporates through the stomata into the atmosphere. Working with dendrochronologists she was also able to examine how changing water availability and other environmental stresses are made visible in the patterns of tree ring growth. Examining cores taken during her field visits, she learnt to detect variable patterns in the growth of trees, and to interpret these against other data to understand the differential effects of environmental stress conditions.

In the course of these studies it was not just the tree species she was getting to know, but also the species “scientist.” For as the project evolved, her investigation of the trees, become an exploration of the ways of knowing, and the form of environmental encounter that shaped the scientific knowledge she was working with. This started out as a form of epistemological clash, as her own skills and sensibilities as an artist and a philosopher often met head-on with those of the environmental scientists. These often uncomfortable social negotiations become however, something productive with the formation of a collaborative think-tank. This collective effort, while far from easy going, represents the commitment of both Della Giustina and the scientists involved to work together to explore the different ways of thinking about, and knowing these trees. This collaborative grouping discussed the terms through which the scientific data were to be transposed into sonic and visual experiences, but they also explored how the piece could have a life outside of the site-specific installation and performances at the Institute. A key question the group addressed therefore, was how *you are variations*, and its explorations of their scientific process and data, could travel, not only to artistic venues in Venice, Vancouver and Switzerland as it has done, but also how it could become the means to engage the communities of their study sites. They began to question together, how this work could engage the people who lived and worked around those trees, and in doing so how it could open out a dialogue with them about the changing environmental conditions at these local sites. To understand this further, I want to look now at the encounters staged for us by *you are variations* visual and sonic elements.

## **II. On the interpretation and transposition of metrological and physiological data into visual and sonic events: daily water cycles through Pine tress in Swiss dry alpine and wet midland ecosystem 1: Visualization**

To ‘get to know’ her chosen tree species, and to understand the processes of the hydrological cycle, Della Giustina undertook an experimental process that draw together regimes of visibility in both science and art. The results of these visualization experiments are brought together in a series of three artist’s books. The first book is named for the three tree species it contains: *Alnus glutinosa*, *Carpinus betulus* and *Acer pseudoplatanus*, and it collects together – in a visual collage of sorts – a range of registers of information on these three species. Encased in a cover made from a cross section of the trunk of one specimen of these trees, the visual narrative is driven by an anatomical mapping. This is a

morphological cartography that explores firstly the soil-root interactions, before shifting to the stem, and then in the third section examining leaves and the gaseous exchange with air.

Della Giustina's process of getting to know these trees, materially archived in these texts, involved different forms of approach to these trees, or what she calls embraces. For example, she produced many hundreds of intricate pencil sketches, the result of hours spent drawing branches, pine cones, needles and leaves from life; their detail a testament to the processes of close observation that builds a kind of material intimacy with that which is drawn. Such a way of knowing is at once technically akin, if qualitatively and emotionally different to the visual 'naming of parts' that she found, and carefully reproduced, in the plates of botanical books in the Institute's Library. An important part of her exploration of how the scientists knew their trees was to experiment, using their processes and technologies, with their visual regimes, to reproduce their renderings visible of those things – patterns of tree ring growth for example – that were not visible to the naked eye. But also important was her collaborative exploration of that which had not yet been rendered visible, in this case the processes of the opening and closing of the stomata. Della Giustina spent many hours experimenting with how to catch on film those microscope motions by which the leaf opens itself to the outside world. The result of all these different experimental processes of engaging-embracing, was a series of visualizations of these trees: from the sublime colors and abstract forms of the blown up, stained microscopic visions; to the rendering of process in the exact grammars of scientific diagramming; the intimacies built from the careful, painstaking lines of the hand-drawn sketches; and the mathematical eloquence, and formal elegance, of equations and graphs that record the processes of transpiration and gaseous exchange.

The three artists books layer visualization on-top of visualization. On top of these layers of visual and textual information, is a third layer formed from Della Giustina's written reflections and observations on the working processes. The result is a collage of sorts, in which the formal interweaving of heterogeneous types of material performs a productive conceptual heterogeneity, which opens up questions rather than closing them down. A constellation of relations is created through the overlapping and intersection of this collection of images, texts and data, and the visual and conceptual dialogues that result. But what is the effect of these conceptual and formal dialogues? As a material archive

of process, these books document Della Giustina's becoming intimate with these trees, they are a performative drawing of different registers of material towards one another. In laying her process open in this way, she is rendering visible for us the aesthetic elements of science, creating blocks of affect and sensation alongside finding grace, beauty and elegance in informational content. As we seek to make sense of what these books present they ask us to question the poetic intimacies of the making process, to query our own modes of encounter, and, to explore what other ways of knowing might be possible? It is to the sonic elements of the work that we can turn for further answers to these questions.

### **III. On the interpretation and transposition of metrological and physiological data into visual and sonic events: daily water cycles through Pine tress in Swiss dry alpine and wet midland ecosystem 2: Scoring science: Sounding the world**

*How do changes in climatic conditions modify water cycle and water availability in trees?*

The extended answer to this question might be found in the form of graphs or data sets that indicate changes in micro-climate, the hydrological cycle and that maybe even depict the impact of these changes on the patterns of tree growth. To a certain extent all these materials can be found within Della Giustina's work, most especially the books. But in the performances and sound installations she also sets out to answer this question sonically, to sound those changes, and the differential impact they had at the two sites – dry Visp, and moist Vermweld – that she was interested in.

At WSL in December 2011 three different soundings of the data could be heard. Two were rendered electronically – one for each site – and had been installed in two vertical staircases. The third sound-scape was the magical production of a small orchestra, five-person strong, playing the transposed data amidst the Institute's greenhouses, with audience and musicians alike surrounded by the scientific spaces of forced and controlled growing.

What you hear as you climb the staircases, or listen to as you leaf through the books in the greenhouses, is the sonic rendering of contrasting data-scapes that render audible the processes of climatic differentiation and the diurnal rhythms of life. Walking up the stair-

cases through the sound installation, was to ascend through the what the artist calls a “molecular polyphony,” beginning when the sun rises and ending when the sun sets.<sup>iv</sup> But this journey was as much spatial as it was temporal; as the audience climbs those open fronted stair shafts, performatively re-enacting the verticality of water movements, their ascending passage is tracking up the trunk of a tree growing parallel outside, and this is mirrored in the soundings they hear. The experience begins with soundings from the root/soil interface; moving up into the molecular exchanges in the stem; before at the top of the stair-case dealing with the leave/atmosphere interactions. Importantly through, despite their organic nature, the sounds we hear are not an amplification of the actual environmental soundings, not the rendering audible of sounds normally below the capacity of a human ear unaided by technology, but rather they are a sounding of science, and an aesthetic processing of data.

The process of transposing the data sets from these two sites into the paired soundscapes, was a complex one, and one carried out by Della Giustina and a series of artistic technicians, in concert with the scientific think-tank. Repeated listening raised questions of ‘fidelity to the data’, and about the rhythm and tonality of the resulting sonic renderings of the data<sup>v</sup>. Some recordings were deemed, for example, to flat, to monotonous, others did not sound enough like water or trees. Working with what can only be described as precision Della Giustina developed a rendering of a rhythm and timing of trees by way of a series of operations applied consistently to the data sets. For example, the atomic and molecular structures of the tree at a particular point (eg. soil-root interface) became operations of rhythm, pulse and pitch, and thus sounded in similar ways across the two sites, whilst temperature readings gave the time signature of the piece, and the rate of evapo-transpiration rendered changes in the volume of the piece. Whether aware of the precision of this transposition or not, listeners were attuned to the progression of a process within these trees, in listening they were made attentive to change. Accompanying these environmental soundings are Della Giustina’s insistent questionings, written in the books, and inscribed on the walls, “is this tree, are you, am I- fully accessible to mathematics and science?” And it ends, at the top of the stair-case “How close can you get to this tree?”

#### **IV. Ethical being in the world:**

*“What kind of narratives can raise awareness of the long-term and “hidden” processes of change in the environment?”*

*“Can change in the environment be heard or felt?”*

When the Scientists at WSL were asked to write down questions prompted by their experiences of the installation a series of queries emerged around how these sorts of multi-sensory experiential art installations could help in the demands of scientific engagement? For art theorists concerned to address artistic practices that engage with the environment, a key question, but one that often remains unanswerable, is what is their effect on people? Do these artistic practices bring about behavior change? Such cause and effect is hard to prove, even harder it could be suggested if we overlook the need to attend to what came before these questions: a study of the form and nature of the encounters with the environment that the arts works promote.

Della Giustina’s *you are variations* does not address itself to a particular environmental problem, she does not set out to educate us with a series of facts, or provide a dystopian set of information about climate change and warnings of its impacts on those trees. Rather, what she does in these works is take us straight to the highest order of the problem, asking us to question how it is we ethically relate to the environment. Experiencing her works requires us to explore our encounters with trees, to reflect on the forms of knowledge upon which we tend to rely to formulate our environmental understandings and shape our engagements. As this discussion has suggested *you are variations* is based on a sincere respect for embodied and cognitive practices of the production of scientific knowledge, but in the visual and sonic works Della Giustina creates, she requires from us a process of gentle, but insistent querying. The result is a probing of the intersections of the technological and the aesthetic that is not just to question different knowledge regimes, but is also to render us aware of the power that their mutual implication can have in formulating our encounters with the environment. For if, through the exploration of a sensuous intimacy with our organic surroundings we are prompted into a relationship that opens out the registers through which we know, and that encourages us to embrace conceptual, affective and emotional engagements with the world around us, then this is perhaps one way through which we can develop a more ethical attunement to the world. For this is to cultivate a set of environmental dispositions that cause us pause for thought, and just maybe might move us to learn

more, to act differently, in more ethical ways for the sake of those human and non-human others that we are intimate with.

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<sup>i</sup> Extract from Della Giustina's diary

<sup>ii</sup> Della Giustina's residency was made possible by the organization Swiss Artists in Labs, run out of ZHDK.

<sup>iii</sup> The information in this account comes from several months of ethnography the author conducted during Della Giustina's residency. This ethnography was part of a larger study of Swiss Artists in Labs, and other international examples of art-science collaborations.

<sup>iv</sup> Extract from Della Giustina's diary

<sup>v</sup> Notes from author's fieldwork diaries.