



PLEIN
AIR
LIVE
@
the
KIBBLE
PALACE

GLASGOW BOTANIC GARDENS, SCOTLAND

PLEIN AIR LIVE @ the KIBBLE PALACE Vinyl Record

COLLINS & GOTO STUDIO with CHRIS MALCOLM

Produced: GEORG DIETZLER

Mechanical components: DAVE RUSS

Cover design: NOEL HEFELE

Alder recorded AM, July 14, 2017

Ash recorded PM, June 3, 2017

Aspen recorded PM June 19, 2017

Birch recorded PM June 3, 2017

Elderberry recorded AM July 14, 2017 (on the sample CD)

Hawthorn recorded PM July 14, 2017 (on the sample CD)

Oak recorded AM July 14, 2017 (on the sample CD)

Oak recorded PM June 19, 2017

Oak recorded PM June 20, 2017

The PLEIN AIR sound consists of six sound channels:

Chord/blips - Light

'Flute" like sound - photosynthesis

Bass boom - photosynthesis

Melodic/chords - transpiration

Hiss/noise - transpiration

COLLINS & GOTO Studio



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I. Plein Air Overview

There is a long history of artists painting outdoors, 'en plein air' (in the open air) with a French box easel. In the mid 19th century there were two groups of painters, the Barbizon School committed to realism and direct inspiration from nature. The other the 'Impressionists' committed to a more open and experimental approach to painting; yet also seeking inspiration from nature in the light, shadow, colours, movement and changes over time.

With Plein Air Goto and Collins have worked with a team of scientists, technologists and musicians to construct a box easel for the 21st Century. Like their predecessors, Goto and Collins seek an authentic experience 'in nature'. Where Millet extended the idea of landscape to peasants working in the fields and the impressionists examined the phenomenological exchange between light and objects; Goto extends an interest and the intent to seek empathic exchange with the trees themselves. The work integrates aesthetics, ethics and awareness in the pursuit of a better understanding of the limitations of people-plant and culture-nature relationships. It also addresses CO₂ source and concentration, by monitoring the impact upon a tree. This provides an experiential interface to an important but relatively invisible climate change issue.

The idea of Plein Air began with an experience in 2000 when Collins and Goto visited Duke University forest research facility in North Carolina. The scientists were wiring the forest to test the reaction of the trees to future levels of carbon dioxide. A scientist invited us to climb a forty-foot high structure that was built around and among pine trees. He showed them the portable equipment that would measure the amount of photosynthesis from the tree leaves.

He grabbed a branch of the pine tree and placed the needle leaves between two pieces of Plexiglas called a leaf chamber that was connected to a measuring device. When the sun emerged from a cloud, the photosynthesis rate went up. The scientist asked Goto to put her hand on the leaves to block the sunlight. The meter went down immediately. The response of the tree astonished the artists. The artists called this experience 'epiphany' or 'phenomena of life', Edith Stein's phenomenological concept. It is a sense of lived connectedness and awareness of the relationship between body, mind and environment. Stein said, "[The phenomena of life] includes growth, development and aging, health and sickness, vigour and sluggishness". Through this empathic conception we understand the other's physical and some mental states. Stein considers the phenomena of life in plants can be observed. Collins and Goto wanted to recreate and share the experience with other people in galleries and other exhibition places. They thought about a sculptural form that would help to experience a tree's responses to the atmospheric changes including human actions.

The work began in 2008 and has gone through four phases of iterative development. Phase one was developed during Goto's PhD study. Collins gathered plant physiological equipment. Carola Boehm, a computer scientist and musicologist at Manchester Metropolitan University and Matthew Dagleish, an artist and PhD candidate at the University of Wolverhampton developed the program that translated the plant physiological data to sound. Prof Trevor Hocking, a plant physiologist, University of Wolverhampton became a consultant to assist accuracy and interpretation of the data. Goto and Collins spent a month at Headland Center for Arts in 2008. They chose common native tree species in the area to work with. Each tree was tested 4-6 times in various durations of daytime. Simple sound like a flute was chosen to translate the data changes of photosynthesis and transpiration. After the residency programme it became clear the sound system had to be real-time to observe both the

tree activity and the atmospheric conditions such as the sunlight, fog, a car going by, and a person's breath.

The phase two began at the Crop Technology Unit, University of Wolverhampton. During the time, the system was working and the baseline approach to the new hardware/software system was right, but it remained unstable and needed further development. A technological consultant was hired to trouble-shoot the project system for the exhibition at Peacock Visual Arts in Aberdeen in 2010.

Phase three was working with young sound artists Michael Baldock and Clare Cullen. They constructed sound that was very abstract like mixture of crunching dry leaves and trembling logs. The sound exploration focused on establishing a clear relationship between the real-time system and the sound quality. Combining the physiology monitoring system and the real time sound system still needed to be tweaked and stabilized for the public presentation.

Phase four was working with Chris Malcolm, a computer programmer and sound designer. He always worked with trees when he was programming. He constructed the sound scheme based on photosynthesis, transpiration and the sunlight. The sound system was aimed to make people notice and feel the dynamics of the tree without losing translation of the different data points. When this was accomplished, the scientific information on the screen and the plant physiological equipment were concealed for the audience. Malcolm also developed an animation that would illustrate the physiological activities of a tree leaf. More active photosynthesis made the image greener and more active transpiration made the image bluer. Later on the computer graphic was replaced by a live video image of the actual tree. Plein Air was shown at: The Tent Gallery, in Art Space and Nature, Edinburgh College of Art, Evolution House, University of Edinburgh, U.K. in 2013. George Dietzler, artist and

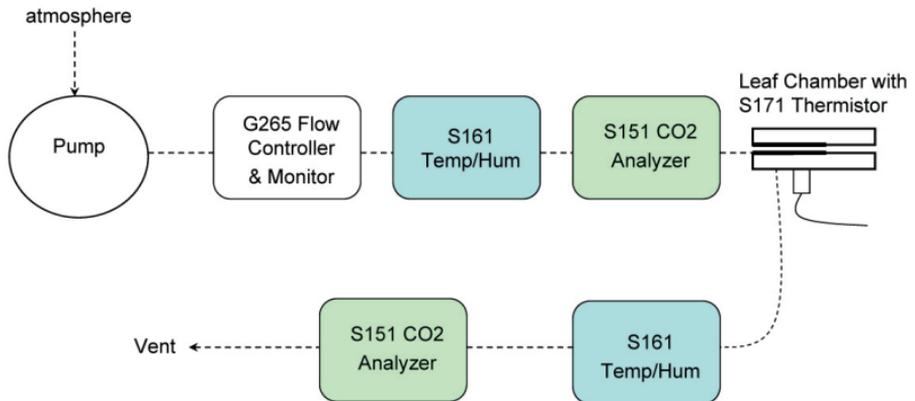
producer, introduced the project to a sound art organization ON-Neue Musik Köln. Plein Air was shown at in Cologne, Germany in 2015. The artists and Dietzler worked again to produce a vinyl record at the Glasgow botanic gardens in the summer of 2017. Scottish native trees were chosen for the recording. The easel box was rebuilt by Collins & Goto Studio, the sound system was refined by Malcolm and the mechanical components were made more compact by Dave Russ. After the recording an exhibition was held at the Kibble Palace, a part of the botanic gardens.

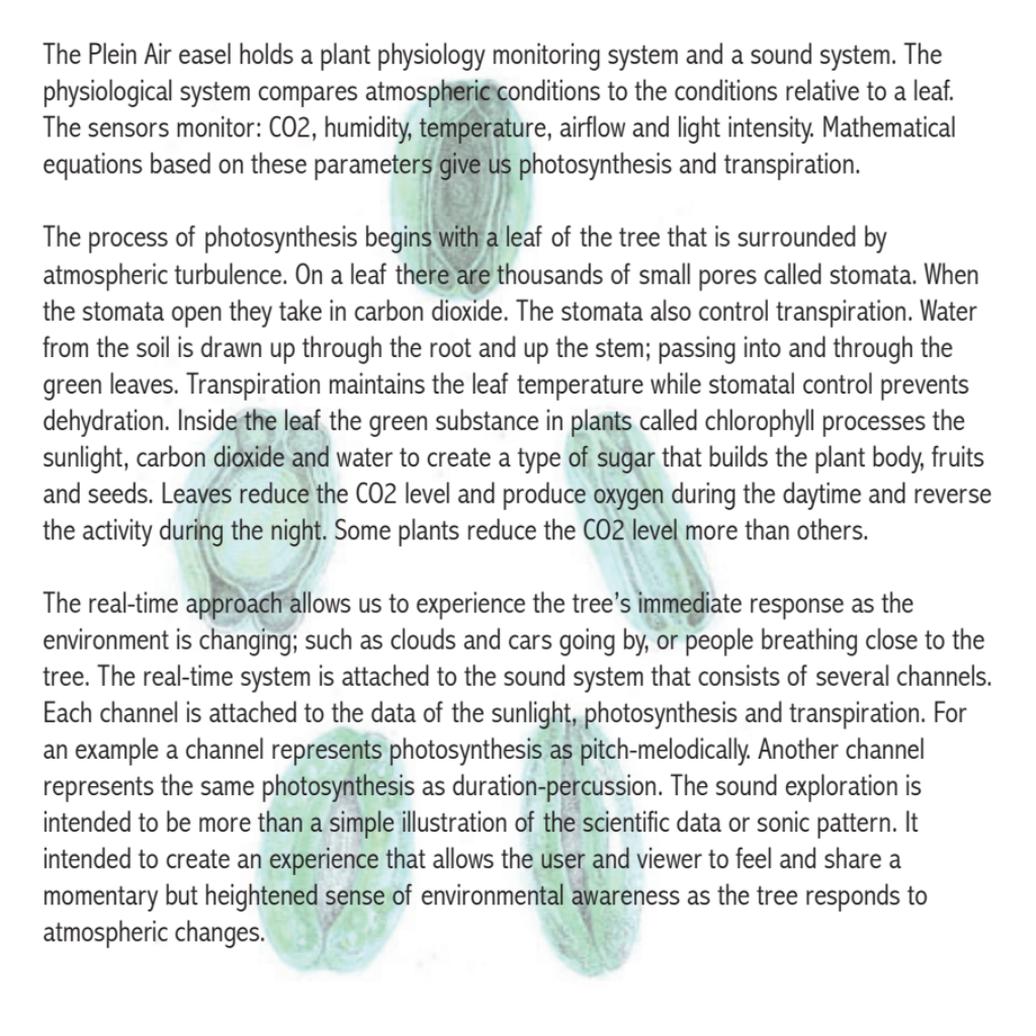
It took for almost nine years to develop Plein Air. Through the iterative process Plein Air became much heavier and less mobile. Rapidly changing weather in Scotland challenges the artists to set the system in outdoor. Collins and Goto are still interested developing a hand-held version of Plein Air that allows the audience to access to trees more freely. They continue to investigate and elucidate interrelationship and potential for empathic exchange by monitoring physiological response and sensed reactions to shred environmental context and conditions.



II. The systems

The original painting easels and the innovation of paint in tubes were tools that allowed artists to move outdoors and immerse themselves in the experience of nature. Plein Air is an interactive device that allows people to see and hear how trees are doing in relation to human interaction and atmospheric change. The easel holds plant physiology sensing equipment and computer programs that translate data to sound. The Plein Air easel includes a stand that holds a tree leaf chamber. It connects the reactions of that leaf to a number of plant physiology monitoring devices in the easel box. The audience will experience sound that re-presents the trees' response to atmospheric changes particularly in relationship to carbon dioxide; caused by human respiration, transportation, home heating and industrial pollutants.





The Plein Air easel holds a plant physiology monitoring system and a sound system. The physiological system compares atmospheric conditions to the conditions relative to a leaf. The sensors monitor: CO₂, humidity, temperature, airflow and light intensity. Mathematical equations based on these parameters give us photosynthesis and transpiration.

The process of photosynthesis begins with a leaf of the tree that is surrounded by atmospheric turbulence. On a leaf there are thousands of small pores called stomata. When the stomata open they take in carbon dioxide. The stomata also control transpiration. Water from the soil is drawn up through the root and up the stem; passing into and through the green leaves. Transpiration maintains the leaf temperature while stomatal control prevents dehydration. Inside the leaf the green substance in plants called chlorophyll processes the sunlight, carbon dioxide and water to create a type of sugar that builds the plant body, fruits and seeds. Leaves reduce the CO₂ level and produce oxygen during the daytime and reverse the activity during the night. Some plants reduce the CO₂ level more than others.

The real-time approach allows us to experience the tree's immediate response as the environment is changing; such as clouds and cars going by, or people breathing close to the tree. The real-time system is attached to the sound system that consists of several channels. Each channel is attached to the data of the sunlight, photosynthesis and transpiration. For an example a channel represents photosynthesis as pitch-melodically. Another channel represents the same photosynthesis as duration-percussion. The sound exploration is intended to be more than a simple illustration of the scientific data or sonic pattern. It intended to create an experience that allows the user and viewer to feel and share a momentary but heightened sense of environmental awareness as the tree responds to atmospheric changes.

III. Artists biography

Chris Malcolm is a Scottish programming professional with over fifteen years of experience developing vector graphic software for demanding industry clients. He also has an extensive background in experimental music using his programming skills to develop tools and instruments for studio and live performance. Malcolm is recognized within the electronic music scene for his use of retro-computers and consoles to generate 8 bit audio and visual experiences. He is particularly interested in 'chip-tunes', which are centred around synthesizer chips that were integrated into older computers and video consoles in the 1980's; long before the onset of CD quality audio.

The work is driven by a curiosity about human relationships to technology as a tool and a random event generator that opens up new levels of expression that are not available with more traditional instruments. Malcolm claims that the machine inspires the artist, he chooses a platform then works out the limitations of its capability before composing and developing new work. His work is deeply experimental, innovative and rigorous in ways that surprise his peers and audiences alike.

Chris is a member of STFU Music an open collective of electronic musicians and visual artists who use the Internet as their main means of communication. He organized the yearly STFU festival in Glasgow in 2006.

Georg Dietzler is Cologne based artist-curator and consultant for cross-disciplinary cultural projects and conferences, networker, organiser of audio-visual concerts, media dance improtheatre, cross-disciplinary conferences and exhibitions. As socio-political and

conceptual artist he works on ecological future visions, linked to social and political change. Dietzler is known as researcher in Art, Nature, Environment and New Technologies, his latest art works are focussed on Bio-Remediation mostly by mushrooms, natural studies by landscape meditation. For Ecovention Europe in Sittard 2017 he's introducing a concept for an inner-city citizens' heirloom orchard. <<http://www.dietzlerge.org>>

Reiko Goto Collins is from Japan, an environmental artist and researcher. Her creative practice is concerned with empathic relationships with living things for over twenty years. Reiko is currently focused on the development of new work dealing with empathic

relationships, sentience and collaboration with a horse a philosopher and an animal behavior scientist. She has been a participant in the women's group, the Council for Uncertain Human Futures at the Institute for Advanced Studies in the Humanities, University of Edinburgh.

Tim Collins is from the US, an artist, author and planner and an honorary research fellow, at the University of Aberdeen. He works across science and philosophy to develop projects related to nature, culture and public space. He is currently collaborating with an anthropologist and a social scientist.

Together Tim and Reiko are principals in the Collins and Goto Studio in Glasgow. They are currently focused on developing new work around the Centre for Nature in Cities (CNC). The first project The Caledonian Decoy will be an installation and a series of programs that play with the time and space of a forest in an urban setting. It is scheduled for exhibition in the Intermedia Gallery at CCA, Glasgow, in 2017. Other recent exhibitions include Future Stratigraphy at the University of Sydney, Australia; plans are underway to exhibit a touring version of Plein Air in USA in 2018. <<http://collinsandgoto.com>><<http://eden3.net>>



Plein Air has been exhibited at:

- 2017 Goto, R., Collins, T., with Malcolm, C., Plein Air-live at the Kibble Palace, Glasgow Botanic Gardens, Installation and producing a vinyl record, Glasgow, U.K.
- 2015 Goto, R., Collins, T., Sound of A Tree, Installation, ON-Neue Musik Köln, Germany.
- 2013 Goto, R., Collins, T., Eden 3: Trees are the Language of Landscape, The Tent Gallery, in Art Space and Nature, Edinburgh College of Art, Evolution House, University of Edinburgh, U.K.
- 2011 Goto, R., Douglas, A. and Coessens, K., Calendar Variations, a performance and exhibition in the workshop “Eco-tone: Object Space Entanglements”, Nottingham Trent University, U.K.
- Goto, R., Calendar Variations, (installation and performance) curated by Douglas, A. and Coessens, K., Lang Byre Gallery, Woodend Barn, Banchory, U.K.
- 2010 Goto, R., Collins, T., Plein Air: The Ethical Aesthetic Impulse. Peacock Visual Arts, Aberdeen, U.K.

A series of collaborative tree recordings produced during the summer of 2017

1. Elderberry

2. Hawthorne

3. Oak



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Produced by Georg Dietzler, Cologne Germany
Cover illustration, Noel Hefele, Brooklyn New York
For more information see: eden3.net

