

Transpositions: From Science to Art (and Back)

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Transpositions was a city-wide event that took place at Audiorama, KMH, Färgfabriken, KKH and the Dome of Visions at KTH. It was the last event of a longer research project that unfolded over a series of 14 events. Transpositions hosted talks, seminars, exhibitions, concerts and installations, all of which centered on *data* transposition – how, in the act of transposition, different analysis, rendering and processes of filtering illuminate knowledge, and how non-representational pictures of data can trigger, interact with or yield new world views. Everything centered cohesively around the use of data taken from neural nets to particle physics to bioscience to astronomical readings, as material for analysis, artistic work, research, or any number of combinations and extrapolations thereof. Transposition, as a set of both concepts and methods, yielded a rich meeting point over these days for scientists, musicians, engineers, artists, historians and artistic researchers.

Epistemic Objects

Installations began appearing in the days before the conference. First there came a mysterious wooden box with a grid of headphone jacks, sitting on a table in the KMH entrance hall. It presented windows of a progressively filtered myriad of knocking oscillators diagonally across its face. Next, microphones suspended from lash-knot tripods appeared, hanging over speakers set on triangular figures drawn in yellow tape on the floor. A group of composers at KMH and I approached one. Thinking the yellow line-work might be a kind of diagram for use, we swung the microphone along their trajectories and listened to the sounds that emerged from its feedback speaker. These visceral experiences of the conference/exhibition's opening epistemic objects promised a wholly unique event.

Transpositions was organized by the research project's team, Gerhard Eckel, Michael Schwab and David Pirrò. Pirrò is a sound artist and researcher based in Graz, whose work includes sound installations, interactive compositions and electro-acoustic works. He is an assistant professor at IEM (the Institute of Electronic Music and Acoustics) at the University of Music and Performing Arts in Graz.¹ Eckel's works in art and artistic research ranges over a host of practices in sound art, composition, installation art, choreography and the creation of computer-mechanical instruments. He is a professor at both IEM and at KTH, and was also a visiting professor for a semester at KMH recently.² Michael Schwab is an artist and artistic researcher. He describes himself as an artistic researcher who "interrogates post-conceptual uses of technology", with work in drawing, photography, printmaking and installation. Schwab is a researcher at the Zurich University of the Arts, and a research fellow at the Orpheus Institute, Ghent, and the University of Applied Arts, Vienna. He is also one of the founders and the editor-in-chief for JAR, the Journal of Artistic Research.³ The three have been collaborating on projects for several years. Transpositions set off with an ambitious program of "artistic forms created from scientific data that respect the epistemic potential of their material under aesthetic conditions", and questions like "How can scientific data be pushed to the limits of representation?", and "What if artists were to extend scientific methodologies while radicalizing their stance in post-conceptual art under the heading 'artistic research'?"⁴

¹ Taken from David Pirrò's website: <http://pirro.mur.at/>

² Taken from Gerhard Eckel's website at IEM: <https://users.iem.at/eckel>

³ Taken from Michal Schwab's website at Research Catalogue:
<https://www.researchcatalogue.net/profile/?person=10953>

⁴ From <https://www.researchcatalogue.net/view/94538/331101>

The inaugural talk was already planned to buck conference convention in favor of a more spontaneous forum, as explained by Gerhard Eckel. Projected on the back wall of the Nathan Millstein hall was a two-dimensional transposition of a multi-dimensional set of data collected from a neural net. It had a star-like quality, this paper-thin slice of a more complex object. It's white points seemed to react to one another and re-group on a blue-black background, implying a logic hypnotically un-graspable by the viewer. Before this backdrop, and sometimes referring to it, Eckel, Schwab and Pirrò opened proceedings in an open conversation, leaping between the many facets of their project and the various directions it had taken. They also illuminated some of the over-reaching processes and ideas of the vast swath of conceptual material in their project.

The removal of portions of data from a set as a way to reach new modes of transposition, as with the removal of dimensions in the neural net piece, was a hallmark subject of both this conversation and much of the work of the conference. This was addressed from the most possible angles by Michael Schwab. Schwab introduced the central idea of the *epistemic object*. He spoke about escaping both the formalization of information and the duties of representation in such objects. Eckel and Pirrò then embarked on a discussion of "noise". After all, they said, the reality of data sets before they have been processed or filtered is noise. Until the traces are filtered, according to one parameter or another, they are difficult or impossible to make sense of. Noise then deteriorates knowledge, at the same time as illuminating the possibility of it. The resulting work of much of the conference, then, was a group of epistemic objects which were not representational, but coherent. The data sets and the different choices each of the artists made about how to make use of them offered a vast palette of materials and processes for those objects. The concluding idea of the conversation described an "imaginary dynamical system"—one which is not functional, but is suggested by spatial-sonic relationships and other aspects of the transposition of the data at hand. Like the neural net projection presiding over the conversation, and the other works at Transpositions.

This idea of the epistemic object was then further elucidated in the keynote talk by Hans-Jörg Rheinberger, Director of the Max Planck Institute for the History of Science in Berlin.⁵ He spoke from a scientific perspective about the creation of epistemic objects in order to gain knowledge, but also described the limitations of that arrangement. He demonstrated reciprocal transmission between different forms of transposition, using four very different transposed data sets depicting a strand of DNA. Each model represented a different method and concept – trace, residue, data and representation. But when held side by side, a fifth, composite image emerges. Their differences showed how the predominant traces and missing elements of each given model presented a more detailed picture of particular aspects of their subject in each case, and overall, as a group. Quoting Levi-Strauss, he added "knowledge of the whole precedes that of the parts".⁶ Rheinberger went on to say that "instrumental mediation" is focused solely on a result, leaving no room for the necessary indeterminacy in experimentation. But this durability, said Rheinberger, is a requirement for the epistemological model. The clashing models, showing very different versions of the same object, refuted the concept of the representational, tying back into Schwab's comments on escaping that duty. Rheinberger spoke finally about the volatile character of data traces, which played out in many of the subsequent works of the conference/exhibition. Here the earlier conversation about unfiltered data sets as noise was answered – models rest on reducing complexity. And both the conversation between the research team members and Rheinberger's talk demonstrated how we can create complexity in models and data-space: by comparing different- and differing- models.

⁵ Taken from Hans-Jörg Rheinberger's website: <https://www.mpiwg-berlin.mpg.de/de/users/rheinbg>

⁶ Strauss, Levi, *The Savage Mind*, 1962, Weidenfeld and Nicolson, London, pg. 24

These ideas discussed in the opening talks ran as coherent themes, methods and materials throughout every aspect of the works in the following events. Even as broad a spectrum of practices, fields and ideas as was at play, this meant that the whole conference/exhibition had a deep cohesion to it.

Sound Events

The microphones hanging over their speakers all about the town were echoed in the installation *The Illusion of Simultaneity*, by Gerhard Eckel, David Pirrò and Martin Rumori, at Audiorama. It felt like the epicenter of a group of satellites, each duplicated in a circle atop a new triangular diagram, echoing the microphone-speaker objects set in each of the conference's venues. The installation implied a connection without physically building it. When confronted with the microphone-speaker systems here, one was reminded of those throughout the city, and thus inferred that the sonic data collected at those points informed the sounds emerging at this nexus point. But it was only the process, objects and implication that were related. Each microphone-speaker system had its own single board computer, running the score in Supercollider or C, and it was only even a portion of those in the room at Audiorama that were physically connected. So the installation asks if imagination can fill in the missing information, and allow the listener to complete the network. Audience members approached the systems to experiment with them. They sometimes played back immediate recordings from the room. These echoed and bounced into the background, somehow implying again that these were data collectors, as well as processors, with some connection to the greater world.

For the making of work in Stockholm, all the participating artists were given sets of data for use in transposition-based work, including two of Audiorama's instigators and directors, composers Magnus Bunnskog and Marcus Wrangö.

503 Cluster Waves, Wrangö's virtuosic installation, stood in MDT's Studio 2, situated next to Audiorama. It utilized a single row 28 Genelec 8020 speakers for a technique based on Wave Field Synthesis. The spatialization was very convincing. One could walk through a row of dynamic, moving but well pin-pointed sonic objects. And although there was no sub-bass unit in the installation, the work still created the strikingly huge, well-defined bass characteristic in much of Wrangö's work. The data used here was taken from a galaxy cluster survey, which Wrangö described as "geometric" in his program notes. There was a carefully synched lighting system projected on the wall where the speakers stood, whose intense, multi-colored gestures in the darkened room, definitely enhanced the sonic and spatial experience.

Bunnskog's installation, *Friedmann balancing a pencil on its point*, was in the café of MDT theater. It had two parts: a floppy-disk driven disklavier, and a flat gong with a pencil suspended over it, its sharpened point touching upon the gong's surface in response to data sent to a transducer on metal speaker, i.e. a kind of Ondes Martenot. While the disklavier's sparse materials were drawn from cosmological data, the pencil was transposing a recording of Bunnskog, writing down the dataset he had been given in pencil, by hand. The viscosity of the mechanical components, all moving in anti-tandem, with the piece standing as it was in a brick room with french windows, gave the whole piece a wonderful mechanistic quality, implying pre-digital machine networks. The space given by the minimalistic quality of the serial-esque piano material, and soft scratching of the pencil on the resonating brass cymbal, implied the cosmological vastness to which it spoke – a simultaneous counterpoint of chamber pantograph, tracing galactic motion and cosmological silence.

Back at KMH, a collaborative concert/installation took place in the Klangkupolen. In *Complexity and Complication*, the catalogue for the conference/exhibition, *da ta*, was presented in performance

by its creator, artist and graphic designer Luc Derycke.⁷ A live projection of Derycke's hands, methodically turning the pages of the catalogue slowly enough for us to read portions of it, was projected as both a performance and to conduct the sound work from Eckel and Pirrò.

The catalogue, similar in format to the larger OEI magazines, opens with Michael Schwab writing briefly about the multiple meanings and connotations of the word transposition across fields. Suggesting that transposition may simply mean "the simple displacement of a thing", he opens the catalogue with a question: "...in the field of artistic research, do we find what we seek in already existing definitions, or are we, in fact, complicating the term to fit our own interests and practices?"⁸ The book then commences as a document very much in motion. Paragraphs of text and images of visual art works are printed in varying sizes and orientations as one travels through it. The catalogue presents fragmentary and distilled portions of exhibitions, talks, writings and events from throughout the research project's fourteen events, recapitulating the practice of removing information to illuminate knowledge. The catalogue also continues past the exhibition as an entity unto itself – there is a website which has a soundtrack, with a track for each of the catalogue's 810 pages.⁹

The dome of 29 speakers in the Klangkupolen is a creative work in its own right, as well as a magnificent tool for research, which a composer, sound artist, engineer or artistic researcher meets with their work. The slow turning of pages, sometimes in sequence, sometimes stopping, or grouping them vertically in the air, melded into the book itself, and the projection of this choreographical "reading" directed the sound events, sometimes appearing also to be directed by them, or wholly autonomous. Using the lower two rings of the dome, Eckel and Pirrò gave its cathedral-like configuration an immersive quality, at once immediate and variously distant. There was a compelling focus in the sway between pure synthesis and binaural field recordings, taken in Stockholm and Graz. The bells and ocean waters of these recordings approached and refracted in the space with motion that was at once subtle and focused – sometimes scattering behind the ever-flocking and hocketing sweeps of the data-triggered oscillators, sometimes suddenly so clear as to recreate a wholly binaural effect in the wide field of sharp or tremulous pulses. I asked Eckel to explain the structure of the work to me afterwards. He described a dynamical system devised by Pirrò, capable of "digesting any data", comprised of 48 coupled oscillators mapped to Gauss pulses. On his own machine, Pirrò could change the parameters of those oscillators or use them to modulate sine waves. He could then send them on to Eckel's machine, who could map them in space, or use them together with the concrete recordings. The piece was exactly that kind of "imaginary dynamic system" appearing throughout the conference on a grand scale. The hour-long work maintained a compelling focus sonically, spatially and in contemplation of the questions at hand.

David Granström's work, *Interference*, was presented at the Dome of Visions. Based on data-sets drawn from muon-proton scattering, it had two components working in tandem. There was a visualization of the changing dataset projected onto a wall, and the resulting control of mechanical motion and sound from the "rattler" – a mechanical percussion instrument Eckel built using solenoids to play the Dome of Visions as an instrument by striking its surface, and which Granström has been building a cellphone-based interface for visitors to use to play it. Sitting in the inner room of the Dome, the video projection changed configuration every minute or two, triggering a response from the rattler that was at once understandable as a transposition of the same information, grouping and spinning away in clusters and knocks. Simple but ever-changing, one got the sense of the logic of the work permeating the Dome with an ongoing stream of dynamic sonic objects. The work was elegant, from the snappy interaction between the clean, yet hypnotic video

⁷ More about Derycke and the catalogue can be found at Derycke's website: <http://www.studiolucderycke.be/projects/view/1266>

⁸ *da ta* catalogue, pg. 1

⁹ The Soundtrack to *da ta* Catalogue can be found at: <http://da-ta.at/>

projection, depicting changes in the data, to the perceptible changes in the rattler, whose only sound is comprised of physical knocking, spatialized by the placement and triggering of the solenoids.

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Each of the works in this collection of epistemic objects and systems was much more sophisticated than works that simply sonify data or carry out some other mechanical transpositional function. These works each offered a complex of new ways of regarding both the data at hand, and an unexpected view of their subjects and contexts through this deeper exploration of the act of transposition. They also demanded completion by those who listened to, or experienced them, either physically or imaginatively, as an additional method of illumination. From the point of view of a contemporary music listener or practitioner, these works all shone as sonic works as well. In walking to the train with some composers from KMH, a conversation emerged about field recordings, and how they, themselves can be seen as both a capture method for data and as data in and of themselves. As was verbally contemplated from so many angles throughout the conference regarding the works contained in it and the greater research project, field recordings are compelling in part because they are incomplete, and offer a listener the chance to meet them with imagined information.

The last work from the conference I will discuss was the largest in scale in many respects. Here we see the most massive transposition of the conference/exhibition – from Dome of Visions to Elephant Sanctuary.

There were three events at Färgfabriken. One was an introductory performance about the work exhibited there, which we will return to in depth. One was a very spirited talk from Neil White and Tina O'Connel, whose work *Deep Architectures of Inquiry* at Reaktorhallen was unfortunately canceled due to unforeseen circumstances. The transposition of their work back into its formative sources as a conversation, presentation of related projects and set of mock-ups in the "wrong" space, presented with fiery, creative (and justified) indignation, fit unexpectedly well into the on-going discussion of transposition.

The introductory performance about Daniel Peltz's *Performing Labor*, had aspects which were problematic for me. The video camera work used to depict portions of the large architectural model in the exhibition space was not so clear, and I had trouble understanding Ioana Jucan's role. What is more, in a conference dedicated to discussing at least some aspects of data, there had been no overt remark whatsoever on the constant culling of documentation data which is the *modus operandi* of most research environments. But during one of the panel discussions, Michael Schwab had said:

"There is political action, but there is also *action imaginary*... there is a side of action which isn't overtly political, but is invested in changing power structures."

After such an elegant statement about hierarchies and the complexity of multi-layered activities such as this in an environment where data was being discussed at length, I was relatively put off when Jucan asked the audience if we could "keep a secret", and commanded anyone who could not to leave the room, since both audience and performers were being filmed by several cameras and recorded with at least three field recorders. However, the story contained in the presentation about the exhibition itself moved and astonished me more than anything I have seen in years, and gave us a whole new set of takes on the concept of transposition from a myriad of unexpected and impossible angles.

Daniel Peltz is an artist whose site responsive and media installation work explores social systems, attempting to provoke ruptures in the socio/cultural fabric through which new ways of being may

emerge and be considered.¹⁰ Peltz is from the U.S., and has engaged with and lived in Reijmyre since 2007. The marvelous Rube Goldberg-esque (i.e. a deliberately complex) apparatus of objects and actions in the exhibition spanned a vast swath of places and objects, illuminating geo-political social and power systems around work, workers and exploitation in unforeseeable ways at every recursive step.

The initial source of *Performing Labor* is a youtube video of what Peltz calls an "employed elephant", screaming as it dies in the midst of a life of hard labor. The Reijmyre glass factory has a "guest worker" program for artists, where artists-in-residence make an object or set of objects to be included in a special portion of the factory's catalogue. Peltz did this residency. This recording became the material on that object: a glass master, in a glass case, for a DVD. The transposition of this material continues in a multi-level tale. The glass master becomes a DVD, sent to Tom Price, Australia and placed surreptitiously in the town archive's catalogue. The visage of Tom Price, himself, is transposed into mythology, as a mountain god in the heavily exploited town of his name. The myth is transposed into copper engravings, and a work for Peking opera singers. The glass master is cast into a river, to be recovered a year later, together with a badly disintegrated trolley from the factory, by a deep water salvage operation. The sound of the elephant on the glass master is cut onto a vinyl record, and Peltz's telling of this multi-sequence of events is sent from a radio speaker without transmission. The large architectural model at the center featured, on one side, the Reijmyre glass factory, and on the other, a geodesic structure, expanding out over a landscape of bamboo trees, fields, model people and elephants walking through the canopied park.

Peltz's voice rhythmically intoned the story of the transposition of the Dome of Visions into an Elephant Sanctuary, from the recording housed in the radio. He had written to Kristoffer Tejlgaard, the architect of the Dome of Visions, and to his surprise, Tejlgaard accepted Peltz's request to consider a different kind of Dome of Visions and an invitation to dinner. There, after his initial surprise, Tejlgaard agreed to collaborate with Peltz in the design of a sanctuary for "unemployed" elephants in Reijmyre. True to Fullerian principles, it will be designed so that groups of local Reijmyre volunteers can build the entire thing themselves. Hence the largest transposition of Transpositions, transposed into a series of actions world-wide – transposed from the last wail of an "employed" elephant.

There were several conversations and panel discussions which took place over the course of the conference/exhibition. In one, Rheinberger told the story of Albert Flocon, a copper engraver from the Bauhaus school who fled to France – a craft and art-form that has historically contained aspects of both transposition and the creation of epistemic objects.¹¹ Looking at the copper engravings in Peltz's exhibition, done in a traditional Chinese style, of an exploited mining town in Australia, one can experience this connection as another node in the microphone-speaker network of epistemic objects, and form a composite image. Contemplating Schwab's discussion of the use of triangles and triangulation in his work, as related to the removal of seemingly vital components of data to illuminate qualities beyond the representational, one could listen for the what was revealed in the filtering of transposed data. Imagining the architecture of the audio software scores used to generate the group of sound works, while contemplating this multi-mode exhibition where the viewer travels through a global host of transposed models and mythologies in a single gaze, the imaginary network could spin forth more possible epistemic objects of desire. One hopes, with the on-going development of artistic research in Sweden, that more such higher order, multi-faceted events between the arts and sciences can transform the city into new dynamic imaginary systems.

¹⁰ Taken from Daniel Peltz's website: <http://www.danielpeltz.net/>

¹¹ A recording of a full lecture on Rheinberger's research on Flocon can be found here: <https://soundcloud.com/acousmatic-lectures/rheinberger>

For more information about the the research project and the Transpositions event in Stockholm:
Transpositions Research Project, Main Page:
<https://www.researchcatalogue.net/view/94538/94539>

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