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John Sadar, Gyungju Chyon

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Designing With Fog

Abstract. Designing with Fog traces the development of 10 Kinds of Fog: Prototypes, a set of ten ephemeral, dynamic, and environmentally-responsive fog sculptures. Developing the installation required that, as designers, we had to find fog - that we go on a journey from seeing fog as a carrier and enabler, to seeing it as a material with properties that can be explored and designed with. It built on a proposal for an immersive, multi-sensorial Fog Garden, in which fogponics carried plant nutrients. Explorations into ways of delivering, shaping and releasing fog in relation to the plants led to an increasing understanding of fog's own behaviour. Finding fog was thus attuning to changes in buoyancy, litheness and opacity arising from the relationship between materials and the environment.

John SADAR¹,
Gyungju CHYON²

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Designing With Fog

Designing With Fog traces the development of *10 Kinds of Fog: Prototypes*, a set of ten ephemeral, dynamic, and environmentally-responsive fog sculptures. In addition to the more conventional materials that designers work with, such as electronics, plastics and textiles, was the slippery substance we call fog. As defined by philosopher Tonino Griffero, fog is the prototypical *quasi-thing* in that it oscillates between being a material phenomena which can be perceived in itself, and one which colours our experiences and it thus inseparably coupled to them (Griffero 2017). Developing the installation required understanding fog not only as a phenomenon, but seeing it as a material with properties that can be *explored* and *designed with*, and that affords opportunities to the designer. It required that, as designers, we had to *find fog* - that we go on a journey from seeing fog as a carrier and enabler, to seeing it take a central role.

Finding Fog

10 Kinds of Fog: Prototypes emerged from a proposal for an immersive, urban *Fog Garden*, utilising fogponics. *Fog Garden* was exhibited in Ljubljana during the BIO50³. Developing the work meant considering water's peculiarity: its being solid, liquid and gas at atmospheric conditions; it being substance which we experience with the full gamut of our senses; being a carrier of energy and nutrients; and being both a universal solvent and a medium for life. Fogponics - using electronically-produced water vapour as a carrier of nutrients for plants - demonstrated water's multifarious qualities simultaneously.

1. Swinburne University of Technology - School of Design, Australia, jsadar@swin.edu.au

2. Monash University - Faculty of Art, Design and Architecture, Australia, gyungju.chyon@monash.edu

3. Jan Boelen and Vera Sacchetti, *Designing Everyday Life*, trans. Rawley Grau and Darja Horvatic (Zürich: Park Books, 2014), 168-69

The exhibited work included three transparent acrylic fogponic capsules, containing water, ultrasonic fogging devices and perforated planters, and set against a printed visualisation of the work in place. The fog brought the work to life, animating it with the sight and sound of a continuous cycle of phase changes as water vaporised only to re-condense. Rather than simply escaping through the perforations and into the gallery space, as one might expect, the fog was contained, percolating energetically within the capsules.

Releasing the fog was desirable for thermal and visual amenity, as the intent of the Fog Garden was enhancing public space through not only an ever-changing growth and decay of plants, but also through the summertime cooling effect of fog on the immediate surroundings. Thus, the turbulent movement of the fog in the capsules drove subsequent explorations into ways of delivering, shaping and releasing fog in relation to the plants.

Exploring Fog

Figure 1. Fog Garden, image courtesy of little wonder, 18 Sep.2014



As we wondered about recirculating the fog, we also wondered about giving the fog form. In experiments with recirculating fog - involving an outlet for the fog and a suction inlet for recirculation - we came across particular challenges: if the outlet and inlet were close enough together for optimum recirculation, the plants did not benefit, while if the outlet and inlet were far enough apart for the plants to benefit, the fog would disperse into the air, rather than recirculate. Meanwhile, the fog seemed reduced to merely a technological fluid, lacking the percolating vitality that had made it so captivating in the exhibition prototypes. It seemed that as we gained greater precision in controlling the fog's movement, direction and volume, we diminished fog's own atmospheric allure, for the more we controlled it, the less it seemed like the captivating phenomena that fog is.

Heightening and understand fog's own behaviour, required reducing the design. Considering that fog is categorised by the interaction between material and environment which gives rise to it (such as radiation fog or evaporation fog), if we were to work *with* fog, it would mean working with the dialogue between fog, materials and the environment, in order to manifest their fluctuating interrelationships⁴. We began to experiment with putting the fog into contact with different materials. We tried

4. World Meteorological Organization, "International Cloud Atlas," World Meteorological Organization, <https://cloudatlas.wmo.int/home.html>

pushing the fog through geotextiles, whereupon they acted as filters, giving fog different textures and weights. The fog began to move slower, and become thicker. It began to linger and started to exhibit its own qualities, rather than immediately dissipate in to the air.

We began to experiment with paper. When we placed fog into contact with paper, fog alternately gripped or slid over the surfaces, and lingered. When we placed solid objects on the paper, the fog slowly reacted in dialogue with its environment. This suggested that rather than controlling fog, we should enable it to communicate with its environment. In oscillating between thing and atmosphere, fog became more thing-like at this point. The more we explored something as insubstantial as fog, the more it began to feel like a material - akin to ceramic or steel - that we could work *with*.

Designing With Fog



Figure 2. *10 Kinds of Fog*, image courtesy of little wonder, 7 May. 2017

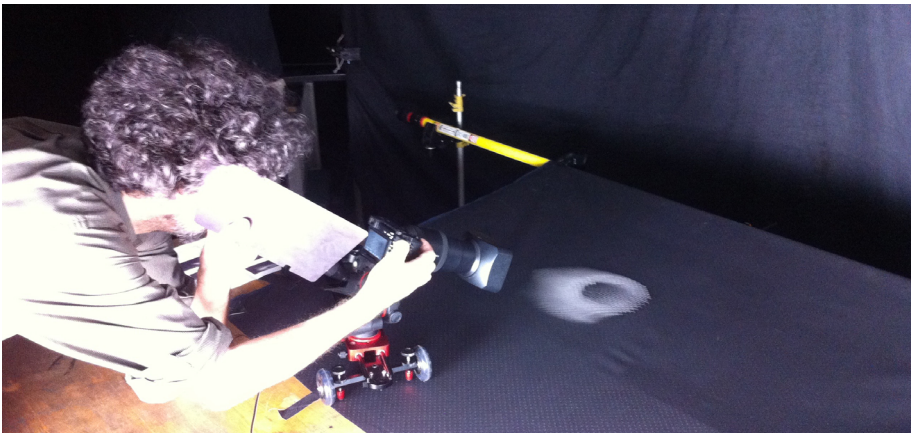


Figure 3. *10 Kinds of Fog*, image courtesy of little wonder, 7 May. 2017

We continued to explore how fog behaved in relation to different textiles in different densities, porosities and layers. We allowed the fog drop onto the materials, move along them, and grip them. As we did this, we began to wonder whether, more than interacting with surfaces, fog could actually be shaped by them. Could fog be formed?

We hybridised our two approaches, pushing fog through the various textiles we had been exploring. We let fog drop through them from above, then pushed the fog through them from below, letting it interact with the textiles as it sat atop them. As

we did these effects started to emerge, as if the textile became a stage and the fog began to dance with air. Allowing the fog to accumulate in a plenum before being released through the textiles further amplified it, and enabled us to sculpt it, as we altered the plenum geometries, from square boxes to linear troughs to cylinders to toroids. The results were varied, but equally transfixing fog formations; turbid jets, effervescent fountains, slithering vortexes, contemplative squares, and striated rings each emerged from nowhere only to disappear once again, each revealing fog's structure and texture as a quasi-thing. We combined the mechanics and electronics of ultrasonic foggers, fans, plenums and integrated lighting, with the geotextile filters and stretched fabric surfaces, into a set of ten black boxes: *10 Kinds of Fog*.

The fog in our design studio, however, was not only the product of the experimental prototype we had made, but was also very much a product of the thermal properties and movement of the air of the studio itself. Everyday in the studio, the prototype behaved slightly differently, and each time we moved the prototype from the design studio to the making workshop to the photography studio and ultimately to the gallery, we felt like we were gambling, as it was hard to predict what to expect. Each move altered the fog's buoyancy, litness and opacity. In a photo studio in New York's Chinatown, an open window which allowed the sound of the subway thundering over the Manhattan Bridge to permeate the space, an itinerant cat racing to and fro, a creaky and uneven wooden floor which moved with each step, the heat of the lighting and the placement of the photographic backdrop all manifested in unforeseen influences on the fog produced. The double-height ceiling and air conditioning system of the RMIT Gallery, as well as a neighbouring work, which was continuously dropping to the floor and rising back up to the ceiling, affected the work in unpredictable ways. The most extreme side effect of these came when the gallery's cooling system malfunctioned, creating refrigerator-like conditions within the space. The *10 Kinds of Fog* were reduced to one kind, as each of the plinths was covered in fog so thick it was liquid-like. In each of these places, the fog performed a different dance with the air, but retained its own beauty. *Finding fog* was thus attuning to changes in buoyancy, litness and opacity arising not only from materials, but their relationship to the environment.



Figure 4. *10 Kinds of Fog*, photographed by Mark Ashkanasy, image courtesy of little wonder, 14 Sep. 2018

Artists and designers have turned to fog alongside other quasi-things in the past. In the late 1950s through the early 1960s, Yves Klein engaged energy and phenomena to produce works in which he was no longer completely the author, but the phenomenon itself was an active participant, as in his proposing an “architecture of the air” composed not of walls and roofs, but of air, fire, and water - phenomena that were ephemeral,

and immaterial⁵. Treading similar ground to Klein, Hans Haacke's *Condensation Cube* of 1965, for example, comprised distilled water sealed within a transparent acrylic box, to create a system which reacted to the surrounding environment of the gallery⁶.

Fog's atmospheric quality has been a component of immersive installations from contemporary artists like Fujiko Nakaya, with works from the 1970 *Pepsi Pavilion* through the 2002 *Blur Pavilion*, and Ólafur Eliásson, from *Yellow Fog* (1998) to *Fog Assembly* (2016). In capturing miniaturised clouds indoors, Berndnaut Smilde's elaborately staged photographs are captivating in that they portray vapour as a thing, both alien and fragile, reminiscent of *Earthrise's* portrayal of Earth against the backdrop of space. *Cloudscape* (2010) by Tetsuo Kondo and Transsolar straddles these in its stratification of air: one approaches a hovering cloud from below, that then becomes an immersive atmosphere⁷.

10 Kinds of Fog, on the other hand, presents fog as a quasi-thing: a structured, material phenomena in itself, a carrier of information about the behaviour of the air, and a colourant of experience (Griffero, 2017). Whereas the aforementioned works are architectural in scale, *10 Kinds of Fog* was akin to bonsai, contained to an uncovered 40x40x10cm space atop each of the ten black boxes. Just as bonsai draws one's attention to otherwise unnoticeable qualities of a tree, *10 Kinds of Fog's* diminutive size lifted the viewer above the phenomena, and foregrounded formal and textural qualities that are not readily apparent. Yet, being uncovered, *10 Kinds of Fog* enabled the audience to interact with it, as it flickered, evanesced and returned in response to the waving of hands or blowing of breaths, as they, too, *found fog*.



Figure 5. *10 Kinds of Fog*, photographed by Mark Ashkanasy, image courtesy of little wonder, 14 Sep. 2018

5. Yves Klein, *Yves Klein 1928-1962: Selected Writings*, trans. Barbara Wright (Tate Gallery, 1974), 35-38

6. Walter Grasskamp et al., *Hans Haacke, Contemporary Artists* (London ; New York: Phaidon, 2004).

7. Gernot Böhme et al., *Architectural Atmospheres: On the Experience and Politics of Architecture* (Basel: Birkhäuser, 2014)

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