FOLL(i)CLE

A Toxi-Cartographic Proposal for Bangkok

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1 A visitor partaking in the hair analysis protocol (Visut Innadda, 2019).

Scenario

In the early months of 2019, air pollution in Bangkok reached a record high, bringing national and international attention on the air quality in the South East Asian cosmopolis. Although applications such as real-time pollution maps provide an environmental reading from the exterior revealing the "here and now," they do not take increment and accumulation as factors to consider. This project was conceived around understanding the human body as the medium that resists classification as either an interior or exterior environment and inherently performs as an impressionable record of its surroundings. Can a city's toxicity be read through its living constituents? Can the living bodies that dwell, navigate, breathe, and process habitable environments be accessed? Can architecture retain a degree of independence while also performing as a beacon for the collective?

Response and Development

Along this line of questioning, it was found that human hair is an actively and effortlessly grown material that is perpetually cut and discarded while also being a complex matrix that retains environmental content. Additionally, it possesses various architectural qualities, although not normally conceived as a material, with a degree of tactility, translucency, tensile strength, while also fully sustainable and biodegradable. It has been tested and proven that hair can be understood similar to the rings of a tree, where hair segments correspond chronologically to the person's environmental exposure to various elements (D'Urso et al. 2016). Foll(i)cle was thus developed under two complementary facets, a

PRODUCTION NOTES

Architect:	Pareid (Déborah López & Hadin Charbel)
Status:	Built
Site Area:	16 sq. m.
Location:	Bangkok, Thailand.
Date:	2019

2 Participants clipping a hair sample

3 Anonymous protocol questionnaires from different participants

4 Participant filling out protocols.

5 Anonymous hair samples from different participants

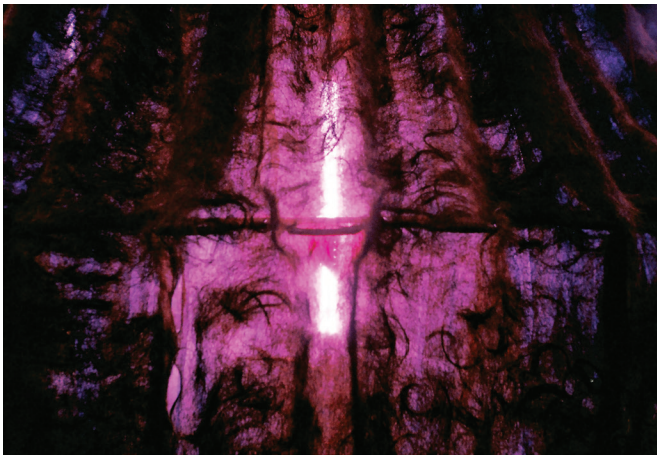
pavilion and a protocol, the former used to intrigue and gather the public, and the latter used to voluntarily and anonymously allow visitors to participate in a hair sampling process in the analysis for heavy metals. These two elements in concert resulted in a third facet of the project, an interactive public website that seeks to map urban environmental toxicity through its inhabitants.

On the pavilion front, the project was materialized through the collection of 30 kg (66 lbs) of discarded hair clippings felted with a custom needle felting machine into hair sheets, in which the only qualification for what hair can be used is the minimum length.

The machine most closely resembles a common ink-jet printer in that there is a feeding point, a linear action in the body, and an exit point. Specifically, it consists of a roller that feeds the un-felted hair, which also helps to press it flat. Inside the machine, there are three rows of felting needles that move up and down driven by an electrical motor that converts rotational motion into linear motion (much like a car piston) which mechanizes and industrializes the action of the common single needle felting method. The speed of the roller feed and the felting are independently and manually controlled by two dials at the top of the machine; this allows for a customization in the process which results in a variation of looseness or tightness depending on the initial thickness of the layered hair fed into the machine as well as the quality (some batches of hair inherently possessed a smoother quality and others a more entangled and frictional characteristic). The process is relatable to a form of craft between human and machine as there is a relationship linking observation, action, and outcome that is gradually refined and in some ways becomes more intuitive over time. This notably added a distinct non-uniform characteristic that allowed for gradients, patches, and various color mixes to emerge in different areas.

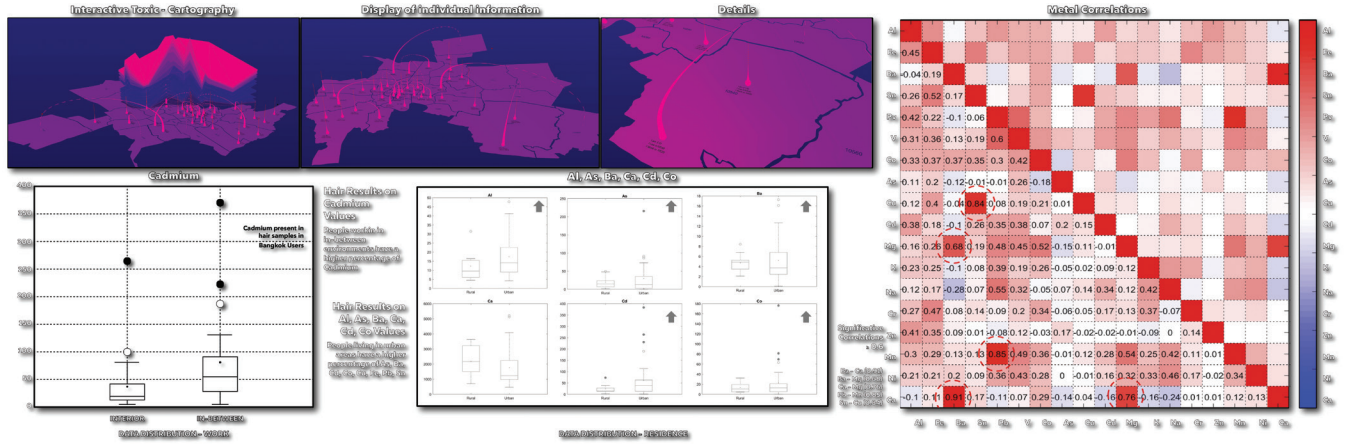
The pavilion sought to experiment on material affect by seeing how the presence of this human-grown content in large scale would cause visitors to react or respond. Intending to gather the public, the overall form was

6 Exterior hair detail (Visut Innadda, 2019).



7 Translucency effect seen from the exterior. (Visut Innadda, 2019).

8 Ecosystemic diagram: participants, hair clipping, felting machine, hair mat, pollution app, pavilion, protocol, analysis, and toxicartography.



9 Early iterations of the interactive website including toxi-cartography and hair analysis results.

10 Hair felting machine and process.

11 Pavilion exterior with hair and steel sub structure. (2019, Visut Innadda).

designed to be obelisk-like while being large enough to accommodate a small number of people at the same time.

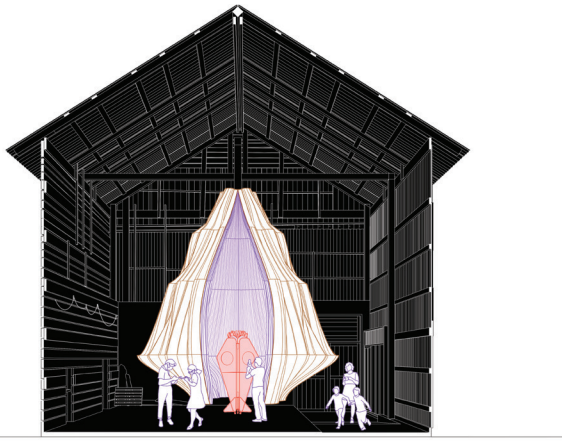
The protocol, located inside the pavilion and centered around a hair-clipping device/station, was developed in collaboration with a toxicologist and consisted of a self-administered survey, the tools required for providing a hair sample, and an alphanumeric code that preserves anonymity while allowing participants to trace their own results. Questions of the survey included controls and information in gathering the data for producing the toxi-cartography. For instance, smokers will naturally exhibit high amounts of lead in their hair, thus nullifying the sample's capacity to be a potential indicator of environmental contamination. On the information side, it was important to know if someone was working indoors or outdoors, as well as the areas in which they lived and worked.

With approximately 300 participants having taken part in the process, the first 50 hair samples were effectively tested for 15 heavy metals such as arsenic (As). The samples were intentionally taken at random in order to check for trends.

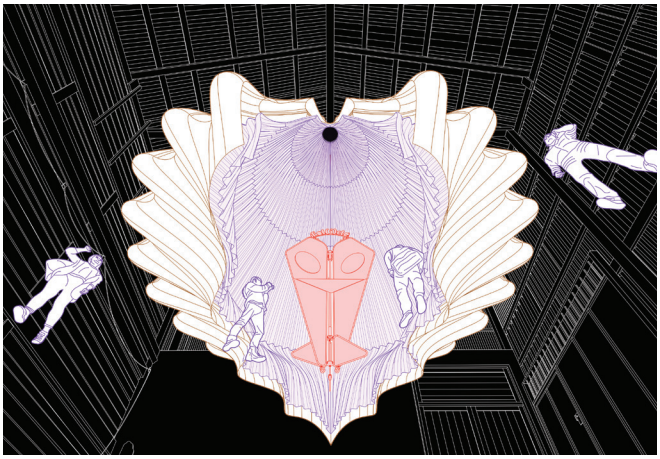
Hair analysis was carried out by Dr. Alberto Salamone from the University of Turin and conducted at the Centro Regionale Antidoping e di Tossicologia in Turin, Italy using inductively coupled plasma mass spectrometry (ICP-MS). The results indeed pointed to some areas for further exploration, namely a zone with a smoker who exhibited high amounts of lead, which would normally in itself not be indicative of environmental contamination, but conversely exhibited high amounts of other metals, thus requiring additional samples from inhabitants within the area.

Currently under development, the interactive website will provide the data visualization, both to see if it is effective as a form of communication to the wider public while also being used as a tool for feedback in seeing which areas and steps to take next. The interactive aspect of the website allows users to filter metals, areas, and cut sections

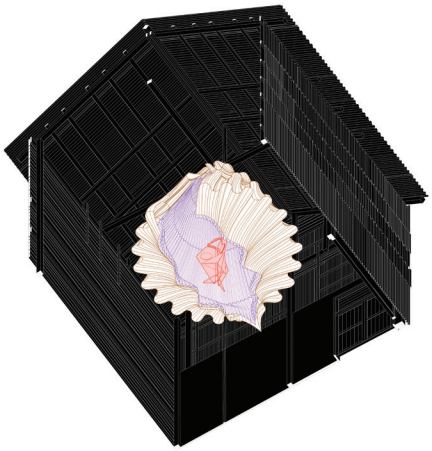
12 Protocol comic.



13 Single point section perspective.



14 Worm's eye view.



15 Worm's eye axonometric.

through the topographic representation of the city in order to empower their own understanding of the region and their actions and choices in how they might engage with it moving forward.

Conclusion

Future development of the project and similar approaches could benefit from expanding strategies and protocols to include non-human agents in providing a more multi-dimensional reading of the urban condition. This would be desirable for two primary applicable reasons: the first is that human bodies are in some ways limited in the types of information they record, and the second being there are other environments that human bodies do not inhabit enough but that are nevertheless vital parts of the ecology. The implications of such an approach, that began with humans but extends into non-humans, would be consistent with efforts to de-anthropomorphize environmental readings as the sole criteria for design and decision making.

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IMAGE CREDITS

Figure 1, 6,7, 11: © Visut Innadda, 2019

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16 Follicle pavilion at night with participant.

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