UNIVERSITY OF CALIFORNIA SAN DIEGO

The Community Bee Clinic

A Thesis submitted in partial satisfaction of the requirements for the degree
Master of Fine Arts

in

Visual Arts

by

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2019

The Thesis of Ana Lisa Korpos is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

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Chair

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University of California San Diego

2019

Dedication

To the rats. To every short-lived creature that taught me how to love unconditionally, to care for failing bodies in their final days, and to keep moving forward despite the enormity of grief. I understand the brevity, beauty, and fragility of life because of you.

Epigraph

We—all of us on Terra—live in disturbing times, mixed-up times, troubling and turbid times. The task is to become capable, with each other, of response. Staying with the trouble requires learning to be truly present, not as a vanishing pivot between awful or edenic pasts and apocalyptic or salvific futures, but as mortal critters entwined in myriad unfinished configurations of places, times, matters, meanings. I want to stay with the trouble, and the only way I know to do that is in generative joy, terror, and collective thinking.

Donna Haraway

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Acknowledgments

To my loving, selfless, and supportive family. No matter what absurd thing I do, you always trust and stand firmly behind me. I am eternally grateful for it.

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ABSTRACT OF THE THESIS

The Community Bee Clinic

by

Ana Lisa Korpos

Master of Fine Arts in Visual Arts

University of California San Diego, 2019

Professor Ricardo Dominguez, Chair
Professor Lisa Cartwright, Co-chair

What follows is a description of the process and research that led to *The Community Bee Clinic*—a radical veterinary practice and multimodal, participatory art project consisting of an interactive gallery installation, along with narrative documentation of individual honeybee rescues. Ultimately, this project culminates in an exhibition where visitors are invited to become emergency caregivers for starving and hypothermic honeybees. Through the use of interspecies nursing care and

speculative biomedical objects, non-human bodies and ecologies are engaged in new ways and at new scales. These objects, methods, and documents involve the appropriation and re-imagining of the concept of a medical clinic—an avant garde veterinary practice reconfigured for invertebrate patients. Situated within the realms of speculative design and social practice, the Community Bee Clinic explores themes of vulnerability, urgency, intimacy, and agency. The interdisciplinary project also functions as an experimental application of research on apian physiology, perception, and stressors, invoking issues of environmental health, interdependence, and non-human socio-ecologies. Integral to the work is the notion of hybridity: both the physical clinic installation and the project documentation operate to blur the lines between art and science, human and honeybee, fact and affect, audience and participant, pedagogy and play, and expert and lay knowledge.

Introduction: Step, Scan, Kneel, Pluck

November 27, 2016. The first time that I saw bees dying en masse, dozens were clustered along the strip of moist, glimmering sand near the Scripps Institute of Oceanography. The bees' formations were curious: dyads and triads of tiny bodies that had been lured to the water's edge, seemingly to perish together. A few feet away from the shoreline, the sand teemed with more bodies. They crawled aimlessly — trembling forms caked with sand. Some laid supine, their wings engulfed beneath the mud strata, pinning them into the ground. Legs and abdominal segments wriggled in vain. The sight was cryptic and loaded with urgency. My day at the beach abruptly transformed into an ill-conceived rescue mission. I began combing the sand—a painstaking process of separating flashes of black and yellow from the ceaseless expanse of silica grain they floundered in. A napkin-lined Zip-lock bag—my ad hoc ambulance—was used to collect as many half-drowned honeybees as possible.

Step, scan, kneel, pluck: uncomfortable intimacy as artistic process. Surfers and joggers did double-takes as they passed me. I must have been a peculiar sight to behold: a teary-eyed woman taking one step at a time along the water's edge, only to crouch down and dig indeterminate things out of the sand like a chimpanzee foraging for bugs with a twig. I did my best to avoid the surfers' gaze. My half-baked plan was to free the honeybees on my apartment balcony, far from the unforgiving ocean, where they might have some chance at survival. Upon returning home, I placed the auspicious survivors in a tomato plant pot. Afternoon sunlight warmed the soil beneath their soaked bodies. Droplets of fresh water and some basil blossoms

were provided to aid in their convalescence, but the bees showed no interest in either of these offerings.

Kneel, watch, wait, hope: a desperate desire to help as artistic process. Over the hours that followed, I fretted and circled about, continually returning to the patio to check up on the rescued bees. Each time, my stomach filled with knots as I approached the tomato pot. Each time, there was less and less motion in the potting soil. Their prognosis seemed grim. I felt powerless, incapacitated by my lack of knowledge and my inability to ameliorate their continual deterioration.

Circle, fret, abandon hope: reckoning with futility as artistic process. It was a war of attrition. One by one, they expired. By the next morning, a cluster of tiny cadavers laid frozen stiff in my tomato pot. The *pathos* of the situation stirred some tender and absurd compulsion in me, and I resolved to discover how to resuscitate any ailing apian that I might find in peril in the future.

June 10, 2018. Mourn, learn, heal, create: peculiar coping mechanisms as artistic process. For two years after my impromptu, ill-fated rescue mission at the beach, I undertook stuttering research, more failed rescue attempts, conversations with biologists and beekeepers, laboratory visits, experiments with sugar-water solutions, flowers, syringes, space heaters, incubators, and honeycomb. Finally, a succession of prototypes for a honey bee intensive care unit came to fruition, and I began resuscitating bees, one-by-one. A radical veterinary practice was born.

I. Background and Art Practice

I develop cross-species art interventions—experiences and objects that teeter between the human and nonhuman-animal worlds, often inhabiting the realm of the speculative. Bringing this work to fruition requires experimental creative research that resides in a transdisciplinary space, nestled somewhere between the disciplines of visual art, the cognitive and environmental sciences, and critical animal studies. An array of multisensorial, participatory, and material forms comprise my practice, including installation, video performance, sculpture, and speculative design. These visual forms serve as explorations of non-human perception and subjectivity, embodiment, and the poetics of fragility. Embodied interaction and participation are the operative processual methods at play, and working with and alongside other bodies has manifested as an integral part of my process in two ways. Nonhuman animals act as subjects, collaborators, or participants in order to activate physical objects, installations, or systems. From rats to dolphins to honeybees, my projects invariably feature animal participants. This embrace of non-human agency and subjecthood is fundamental to the work, ethically and conceptually. Additionally, (human) scientific collaborators also provide data, methodologies, hypotheses, or their laboratories as the basis or site from which the work springs forth.

The Community Bee Clinic exemplifies and expands upon these interdisciplinary and collaborative modes of research and making. The project was heavily informed by knowledge shared with me by graduate student researchers from the Nieh Lab (Department of Ecology, Behavior, and Evolution at UC San Diego), where bee health, stressors, and communication are studied. My

collaborators provided information on honeybee behavior, husbandry, and physiology, along with some formal inspiration vis-à-vis the visual culture and apparatuses of the laboratory. In invoking the concept of the health clinic—one radically reimagined for invertebrate patients—paraphernalia and prototypes in the clinic are meant to blur the line between artist, scientist, and the public. The relational aesthetics embedded within social practice are also imbricated into the work, as anyone can become a co-creator through the act of resuscitating the bees that they stumble upon. The experience of participating in the rescue process is meant to evoke an affective response, a newfound visual sensitivity toward life on a diminutive scale, and an impulse toward care—in short, an enacted gesture of empathy.

What follows in this thesis is an effort to untangle the conceptual and processual threads intertwined within the multimodal *Community Bee Clinic* project—to unravel the aesthetic, poetic, symbolic, and affective dimensions, that, when taken together, cumulatively function to weave the project into art. In addition, I will tease apart the strings stitching the project into science, delineating how its features qualify it as an experimental system in its own right, and how the speculative inquiries ultimately posed by the work train empathy through interactivity. Cumulatively, the project operates within a space of hybridity, merging art and science, honeybee and human, affect and fact, audience and participant, politics and play, and expert and lay knowledge.

II. Exhibition Description

The Community Bee Clinic exhibition consists of three, interconnected branches of the project: 1) an interactive, inter-species mixed media installation that re-stages the objects and ephemera of the clinic, 2) an experimental documentary video that captures the process and case histories of honey bees that received care at the clinic, and 3) do-it-yourself bee first-aid kits offered to visitors.

The material ephemera of this radical veterinary practice (previously housed within my art studio) is transposed to the public site of the gallery for the thesis exhibition. When first entering the space, the visitor is immediately confronted by two abandoned beehives. These pieces serve as a material tracing of bee colony collapse; the beeswax combs are the residual relics of bee colonies that have failed to survive, likely decimated by infections, parasites, or lack of food. The intricacy, geometry, and beauty of honeycomb wax draws attention to the architectural qualities and systemic nature of the beehive, juxtaposing the home of the insects with our own built architecture.

After proceeding past the suspended honeycomb, the visitor finds the re-staged clinic. This installation is built upon hexagonally patterned glass and stainless steel surfaces. It features species-specific biomedical objects that were designed and built for bees, including: a specially fabricated incubator, plexiglass terrariums lined with beeswax foundation sheets, and surgical trays that function as examination rooms *(Figure 1).* Additionally, sugar-water solutions, vials of honey, pollen, queen bee pheromones, native Southern California wildflowers, wax-lined

rescue pods, poly towels, oral syringes, thimbles, and patient history forms are all available for participants to use and interact with.

Figure 1. Community Bee Clinic ephemera, including sugar-water solution, glass vials, thimbles, pollen, native wildflowers, poly towel, and surgical cart.

If volunteers find that they would like to continue enacting this rescue process themselves, take-home, handmade, do-it-yourself bee first-aid kits are offered to visitors for free or for a modest suggested donation.

The second piece featured in the exhibition is a looping documentary video that captures the caregiving processes enacted within the radical veterinary practice, along with its patients. Part performance documentation, part medical drama, and part experimental documentary, this ongoing media work, *Reverse Apitherapy: Collected Patient Histories (2018 - 2019),* is based off two-years' worth of collected patient history notes, along with macro footage of nursing care

administered to both resuscitated and dying bees *(Figure 2)*. With a run-time of eighteen minutes, it chronicles four separate patient cases, portraying the dire condition that the insects were found in, the care provided, and the outcomes of just four out of the dozens of bees that I encountered while undertaking this work.

Additionally, exhibited on the gallery walls are prints of the thirty-plus patient history forms that were my primary, written mode of documenting the process. Each of these clinical intake forms is a data log of patient information—i.e., symptoms, dates, therapies administered, and outcomes, but also feature an elongated section for clinician's notes and reflections, which, when taken together, cumulatively weave the project into a tender narrative arc. The stories of the individual bees—often heartrending, absurd, or darkly humorous, shift the patient history forms away from their ordinary purpose of data collection for citizen science and into the space of storytelling—capturing ephemeral moments of experience, empathy, interaction, and recognition between human and honeybee. In doing so, they subvert or complicate the function of the rote medical form, transforming it into something more akin to an epistolary or a poem. Importantly, blank patient history forms are available for volunteers during the exhibition, so the collection of documents will continue to grow during the course of the show, adding to the narrative. Much like bees' gradual build-up of honeycomb, the story is brought to fruition by individual labor that is directed toward a collective purpose, a common goal.

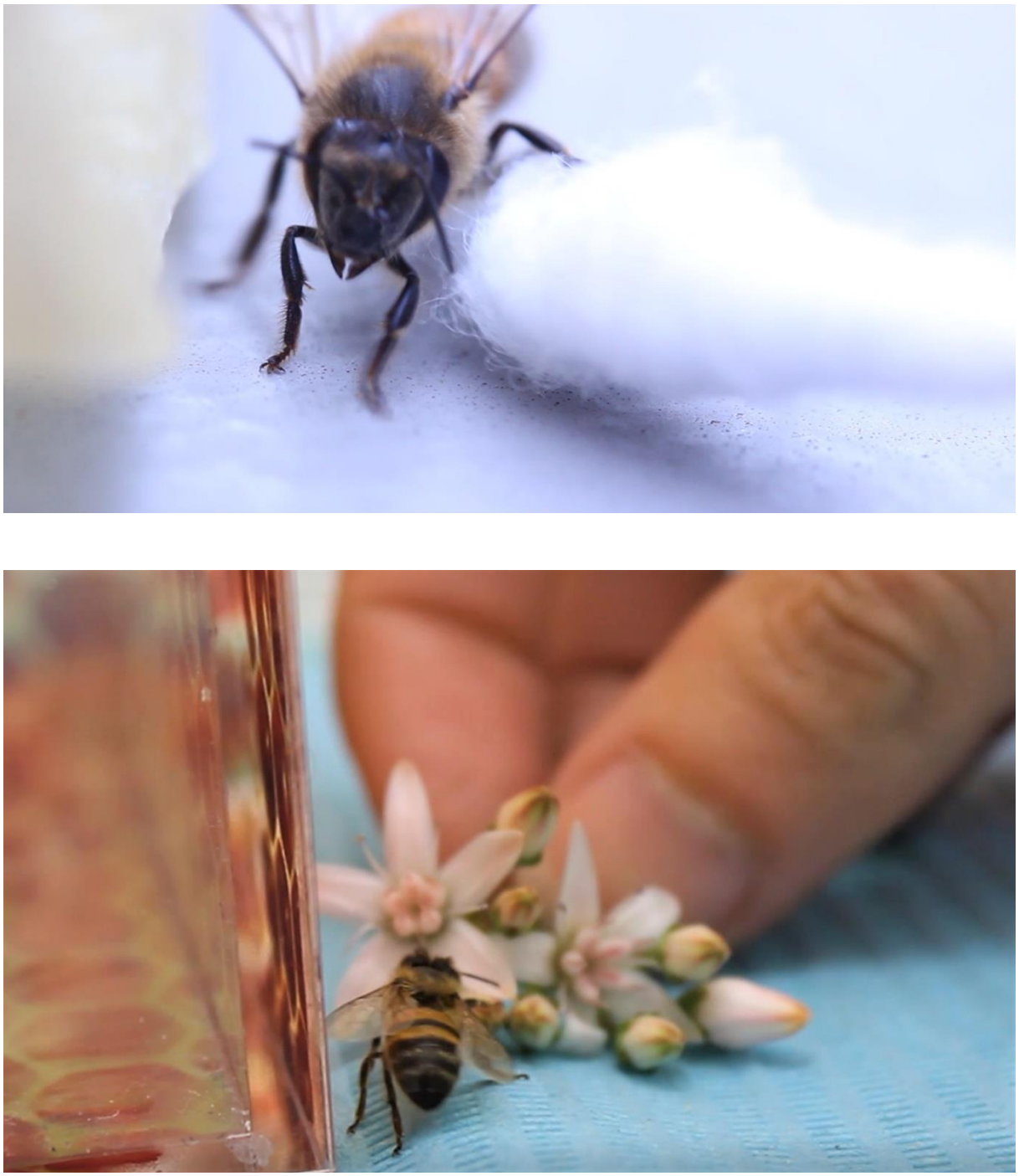

Figure 2. Digital video stills from Reverse Apitherapy: Collected Patient Histories (2018 - 2019).

III. Theoretical Contextualization: Posthumanism, Fragility, and the Speculative

This project was conceptualized as being experiential and relational. It consists of the embodied experience of enacting insect rescues in situ, with each individual honeybee connected to each participant-turned-medic through the nursing process. The core of the work is in training a new attentiveness to the corporeal reality of other living bodies through a performed action; it lies in rendering the invisible visible, in the recognition of vulnerability and the subsequent choice to provide care with one's own hands. This enactment of cross-species care is built upon several affective and aesthetic impulses.

Honeybees, as organisms, are loaded symbols of our own displaced anxieties. As pollinators, their pivotal relationship to our own agriculture and food supply makes them the quintessential representations of ecological frailty. Their social collectivity and interdependence echo some of the overarching and definitive qualities of our own species; the bees function, symbolically, as infinitesimal mirrors for humankind. It is no wonder that the fuzzy arthropods are so beloved, both historically and in popular culture. Their existential peril unconsciously invokes the threat of our own, so the act of saving each bee individually also begs the question of individual agency in relation to environmental and social problems at scale.

In fact, the project began as an absurdist coping mechanism for dealing with biodiversity loss on a global scale. Informed by the idea of the Anthropocene, the world's sixth mass extinction, and the sense of powerlessness engendered by my own inability to effect any change, honeybee resuscitation became an even more pertinent and poignant gesture a year after the inception of the project. Early in

2019, the scientific journal *Biological Conservation* published an alarming review paper titled "Worldwide decline of the entomofauna: A review of its drivers." This comprehensive synthesis of historical reports traced steep, steady declines in insect biomass across the globe. Its authors, Francisco Sánchez-Bayo and Kris Wyckhuys, cited and summarized long-term studies from multiple countries and continents, all of which corroborated the entomological die-off:

> A 27-year long population monitoring study revealed a shocking 76% decline in flying insect biomass at several of Germany's protected areas. A more recent study in rainforests of Puerto Rico has reported biomass losses between 98% and 78% for ground-foraging and canopy-dwelling arthropods over a 36-year period... Both studies agree with the declining trend in flying insects (mainly Diptera) observed a decade earlier in parts of Southern Britain... As insects comprise about two thirds of all terrestrial species on Earth, the above trends confirm that the sixth major extinction event is profoundly impacting life forms on our planet.

The order of Hymenoptera—comprised of bees, ants, and wasps—were some of the most drastically imperiled, along with other pollinators such as butterflies and moths. In total, the review paper listed 40% of the world's insect species as being threatened with extinction in the near future.[1] These cataclysmic predictions are now the context surrounding the work. The absurdity of it all has not waned in the slightest.

Each bee rescue, for me, is still a dubious coping mechanism for dealing with my own ineffectualness, my own crises of personal agency. In the face of such incomprehensibly far-reaching, pervasive loss of life, what can one do but cope? The repetitive act of scanning the ground, lifting up a found bee, and halting all prior actions to provide sustenance, or, sometimes to wait with a bee until she passes away—this process takes on the quality of a ritual or an endurance-based performance, particularly when re-performed dozens of times. The actions become

about bearing witness, serial acts of re-orienting one's attention and learning to how to see an otherwise-unnoticed loss of life. Donna Haraway's analysis of mourning seems especially apt in relation to this:

> Mourning is about dwelling with a loss and so coming to appreciate what it means, how the world has changed, and how we must *ourselves* change . . . if we are to move forward from here. In this context, genuine mourning should open us into an awareness of our dependence on and relationships with those countless others being driven over the edge of extinction. . . Grief is a path to understanding entangled shared living and dying; human beings must grieve with, because we are in and of this fabric of undoing. Without sustained remembrance, we cannot learn to live with ghosts and so cannot think. [2]

Inspired by Haraway's thinking on interdependence and sustained remembrance, the honeybee works bring invisible micro-scales of environmental degradation to conscious attention. Through firsthand interspecies interaction, the precarity of other beings is foregrounded for the volunteer-clinician. The vulnerability intrinsic to these creatures' embodiment is made to be felt and seen: disorientation, poisoning, and starvation are rendered legible. Participants become implicated in the outcome, the fate, of the bees; no longer passive bystanders, they are now confronted with the opportunity to take responsibility and assume their roles as part of a collective experiment.

The psychological and affective valences kindled through the rescue process are also among the most crucial considerations of the *Community Bee Clinic* project for me. Does the human-honeybee interaction engender a sense of concern or urgency? An uncomfortable brush with mortality? Tenderness? Wonder? The repetitive act of saving each bee, one by one, especially in the global context of the Anthropocene, naturally summons futility, melancholy, pathos, and fragility.

The poetics of fragility were an integral consideration. Inevitably, handling tiny, delicate things evokes a sense of preciousness. Taking time to observe a lethargic bee's mortal struggle is a poignant moment on its own, but hand-feeding that same bee sugar-water droplets and watching her wispy proboscis lap them up is an experience of awe, intimacy, and wonder *(Figure 3)*. Performing such acts of care teaches us to be attentive to "the flesh and blood vulnerability of beings—whether human or not" — a notion that is at the core of the work. This attunement to frailty was informed by Anat Pick's book, *Creaturely Poetics,* in which she delineates the creature as being, "first and foremost a living body—material, temporal, and vulnerable." Pick proposes a posthuman aesthetics based on the inherent beauty of the "fragility and finitude" of existence; it is a conception of beauty "that necessarily applies across the species divide and so delivers us beyond the domain of the human." [3]These posthuman poetics were a formative underpinning for the honeybee project. Recognition of, and re-orienting toward the vulnerability of radically-different bodies is a method for developing a kind of 'universal' or cross-species empathy—a way of relating to others that subverts our own ingrained, anthropocentric tendencies. Embodiment, illness, and corporeal ephemerality become the common ground that nurtures compassion, so that we may notice, become attuned, and respond to the tiny, ubiquitous, and troubled bodies all around us.

Figure 3. Video still of a patient being syringe-fed honey.
From Reverse Apitherapy: Collected Patient Histories (2018-2019)

Figure 4. Video still of a bee rescued from a rain puddle during a thunderstorm.
From Reverse Apitherapy: Collected Patient Histories (2018-2019)

This attunement to vulnerability is particularly evident within the imagery of the *Reverse Apitherapy (Collected Patient Histories, 2018-2019)* videos, amplified by the up-scaled, macroscopic shots and the critical state of the fuzzy pollinators *(Figure 4)*. The poetics of vulnerability are also present in the voluntary, performative resuscitations, where these affective phenomena are experienced by participants in real time.

The designs of the honeybee intensive care units are considered and defined by an attunement to the unique sensory and perceptual world of the honeybee—the mind-brain, in addition to the corporeal body. This consideration of the bee's lived reality, its phenomenal world, alludes to Jakob von Uexküll's idea of the *umwelt*—an organism's experience of life as it is constructed by its subjective, spatio-temporal, 'self-in-world' frame of reference. Uexküll used a deceptively-comprehensible and elegant analogy of a perceptual 'bubble' to capture the essence of the *umwelt*: the contours of each animal's reality. Its edges or limits are formed by species-specific perceptual capacities and constraints.[4] Uexküll's notion of the *umwelt* was foundational for my practice as a whole, and it has persisted into my thinking about bees, and how to design for bees.

Designing objects, experiences, or sites for another species situates the work within the territory of speculative design. Of course, we cannot ever truly experience what it is like to embody a bee—that thrumming, fractalized world of compound vision, pheromone signaling, and kinesthetic communication—but in attempting to design a space of safety, recuperation, and repose, a speculative projecting-into

the mind of the honeybee was adopted as a strategy. Dictated by this logic of trans-species perspective-taking, the materials within the clinic—terrariums, incubators, and rescue pods—are informed by the phenomenal world of *Apis mellifera*. Hexagonal geometries, along with the warmth, darkness, snugness, and density of the hive become formal underpinnings for the terrariums' materiality and objecthood. Critically important was a privileging of the chemical senses—taste and olfaction—the bees' predominant mode of processing the world. Foregrounding the olfactory senses necessitated the material integration of beeswax, wildflowers, and queen pheromones into the incubator prototypes and terrariums *(Figure 5)*.

Figure 5. Photographs of overnight housing terrariums at the Community Bee Clinic. Terrariums and rescue pods were lined with queen bee pheromone, beeswax sheets, jade plant blossoms, and acacia flowers.

As with any work dealing with non-human perception and the impenetrable *umwelts* of other organisms—the bees' subjective experience of the world can never be fully verified or empirically validated by us as human subjects. This means that these representations are necessarily tentative, translational, and abstracted—designs based on conjecture. Their form and materiality is dictated by applied research on bees' sensory capacities, but this translation is based on the imperfect, limited, and changing knowledge that we have on the critter's senses, physiology, and nervous system. This tenuousness is part of what enfolds the project within the realm of the speculative.

A distinctly utopian, science fiction sensibility also imbricates the *Community Bee Clinic* into the speculative. Speculative culture has always allowed us to "peer beyond the edges of our current condition," molding the future through the imagining and implementing of utopian alternatives, so that we may, perhaps, fracture the social totality of what already exists. This possibility is predicated upon the notion that our expectations of, claims about, and indeed, the ultimate trajectory of the future itself is produced and reified by the conditions of our present moment.[5] If we accept this proposition—that the future is ostensibly a direct byproduct of present conditions—there are profound implications for art and cultural production at large. If, as artists, we want to "help reinvigorate collectivity and connectivity throughout the larger world," we need to be thoughtful and deliberate about constructing our own re-imagined alternatives to the status quo—our own "micro-utopias." These "small locations of utopian interaction… imaginary 'good places' that do not exist on any map, other than that of the imagination," function

as experiments in "creating physical manifestations of an ideal 'humanity' in an inhumane world."[6] The *Community Bee Clinic* serves as an interspecies micro-utopia; there is an undeniably utopian impulse underpinning the work.

The bee herself—her colony, her 'hivemind', the distributed nature of her cognition—serves as an apt symbol for this kind of social interdependence, collectivity, and connectivity. Additionally, the site itself, along with the imagined biomedical objects, are meant to operate in this principally utopian vein, by inventing, catalyzing, and disseminating a performative model of cross-species care—one based upon the empathetic strategies of perspective-taking and targeted helping. This alternative manifestation of the human-honeybee relationship might not arise elsewhere, if not for the implementation of these micro-utopic installations.

IV. The Scientific Basis for the Honeybee Nursing Protocol

The speculative aspects of the honeybee project bring us to the next section—the scientific research inscribed within the work, along with its troubled and troubling relationship to the epistemic practices of science. I will put forth the proposition that the *Community Bee Clinic* project functions as an experimental system within the bounds of biomedical science and psychology, as it deftly performs double-duty as an experience of philosophical contemplation in accord with the visual arts.

The caregiving process and participatory rescue gestures were heavily informed by biology. The rescue protocol was developed and partly dictated by information borrowed from my scientific informant and collaborator, Bahram

Kheradmand, a neuroscientist who studies the vision and communication of *Apis mellifera* in the lab. Bahram demonstrated for me how the lab's experimental subjects were kept in thermoregulated incubators and fed sugar-water solutions. The laboratory's Principal Investigator, Professor James Nieh, also generously divulged his knowledge on apian stressors and husbandry for me. From Professor Nieh, I learned about the important relationship between bees' nutritional status and their resilience; how their ability to withstand the toxic effects of pesticides, viruses, and bacteria is intimately tied to having abundant food sources near their colonies. This conversation also taught me to integrate synthetic queen bee pheromones into my installation, which gives the patients—convalescent worker bees—the sense that everything is "queen-right," within the space, further expanding the clinic's efficacy in terms of providing care and ecologically-valid comfort for the insects.

Indispensable in developing my bee-nursing protocol was Thomas Seeley's book, *Honeybee Democracy*, in which Seeley shares his fascinating life-long research on the interdependent nature of honeybees. His scientific forays into the physiology, swarming, and decision-making processes of these creatures taught me that they are partly ectotherms. This fact was a crucial one. Honeybees are such interdependent creatures that they need their sisters' body heat just to survive. Their body temperature needs to reach 95° Fahrenheit—similar to our own internal body temperature—before their extremities, including their wings, can become activated, allowing them to fly.[7] Environmental heat—along with carefully-thermoregulated, accumulated warmth within the hive—is what dictates the energy level of the bees. The cumulative body heat of all the thrumming, moving bodies within their enclosed

hives sustains them, allowing them to function. It seems that if bees are removed from their hivemates for an extended period of time, they will become hypothermic, and their wings will cease to work. On especially frigid days, bees can become stranded away from their hive—far from life-giving warmth. These lost, errant bees usually succumb to starvation or hypothermia, slowly shutting down. My realization that this phenomenon could account for all the torpid, dying bees that I found around campus is what led to the creation of the specialized honeybee incubator prototype that I have fondly come to call the Bee Intensive Care Unit / B.I.C.U. / Bee, I See You *(Figure 6)*.

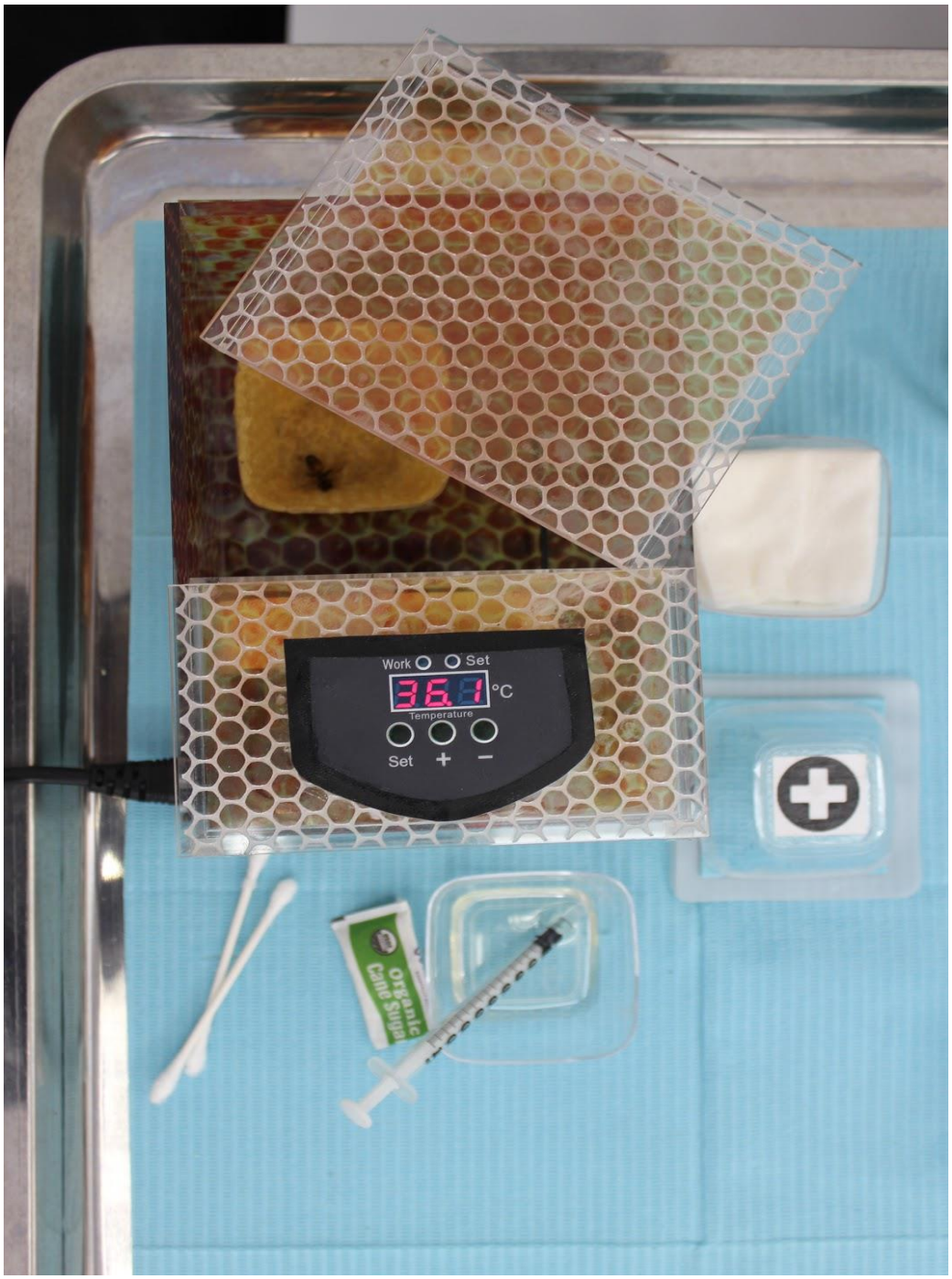

Figure 6. Photograph of the second prototype of the Bee Intensive Care Unit, alongside other clinic paraphernalia, including rescue pods, syringes, and sugar-water solution.

V. Experimental Systems, Empathetic Systems

Inspiration for the radical veterinary practice—both in terms of prototype-engineering and formal decision-making about objects—was partly gleaned from the material culture and apparatuses in the Nieh laboratory. Clear plexiglass cubes, thermostatic heaters, and other biomedical paraphernalia marks the design of the installation. Additionally, many years of my own prior experience with exotic animals' veterinary care left me with a plethora of glass vials, oral syringes, and diminutive medicine bottles, which were perfect for up-cycling within the context of the *Community Bee Clinic*. Choices for project documentation also flirted with methodologies of data collection and citizen science, resulting in text-based patient history notes for each of the rescued bees—medical records, jotted down by participants-turned-amateur clinicians *(Figure 7)*.

However, these appropriations would be just that—playful, tongue-in-cheek imitations of the laboratory's material milieu—if the work did not, on some level, operate in the same vein as a genuine experimental system does. Hans-Jörg Rheinberger has critiqued the familiar notion of the experiment consisting of a hypothesis tested in a controlled setting. For him, such a singular, well-defined, reductive instant is not how scientific progress is achieved, how truth is arbitrated, or how knowledge is produced.

Figure 7. Patient history forms designed for the Community Bee Clinic project.

Researchers do not, "as a rule, deal with isolated experiments in relation to a theory, but rather with a whole experimental arrangement designed to produce knowledge not yet at [their] disposal." [8] Rheinberger further elucidates this position by reasoning that:

> Experimental systems are to be seen as the smallest integral working units of research. As such, they are systems of manipulation designed to give unknown answers to questions that the experimenters themselves are not yet able to clearly ask. Such setups are… 'machines for making the future.' They are not simply devices that generate answers; experimental systems are vehicles for materializing *questions*." [9]

This notion of an experimental *system* is paramount for the honeybee projects. Cumulatively, the various tendrils of the project generate *question*s for further investigation. Numerous inquiries have arisen in response to this idiosyncratic "experimental system" that I have set up. Artists and scientists alike who have engaged with the project have been almost immediately compelled to ask further questions of it—to determine what kinds of future knowledge can be generated by such a system. Some noteworthy questions raised by others include: can we track the resuscitated bees to make sure that they actually make it back to their colonies? If so, what would we use to enact the tagging protocol? Nano-engineered temporary 'tracker' tattoos? And, what problems are jeopardizing our own local campus population of honeybees? My hypothesis, based on the accumulated patient history forms to date (admittedly, with a limited sample size of forty-four bees), is hypothermia and hypoglycemia. Heat and sugar water almost always resuscitate workers—meaning that they're usually starving and/or hypothermic when found).

The phenomenon of mass bee die-off and colony collapse are broached by this work. A conjecture that Professor Nieh put forth about bees dying en masse is that allergies, fear of stings, and public sensitivities are causing people in dense, urban areas to call exterminators and to spray bee colonies with insecticides more often now than ever before. Another speculation from Bahram concerning bee die-off is that the bees' visual cognition and spatial perception hasn't evolved to be able to process human architecture or geometries; that the rapid disappearance of natural spaces within the environment causes navigational failures, and that as a result, the honeybees are unable to locate themselves relative to their hive. The experimental system generates yet another question in response to these speculations: if our urban planning is part of what is threatening our pollinators, can cities be re-designed to compensate for the hardwired navigational impediments?

As demonstrated, the initial prototype has prompted myriad unexpected and compelling questions from visitors' interactions with it. In this sense, it is a generative experimental system that has the power to materialize as many questions about bees as answers. It is also a seemingly organic system—expanding, mutating, and demanding yet more investigation into the subject as the project grows. On a theoretical level, the investigations within the Bee Clinic project can also be considered potential 'epistemic things', as defined by Rheinberger, who posits that the "object of research," usually the "material entities or processes—physical structures, chemical reactions, or biological functions—that constitute the objects of inquiry," can only present themselves in "irreducible vagueness. This vagueness is

inevitable because, paradoxically, epistemic things embody *what one does not yet know*." [10]

There are several nebulous processes latent here. One vague but vital psycho-social process at play within the experimental system is the arousal of human empathy. Ultimately, this project may very well be about investigating patterns of agency, empathetic behavior, and willingness to provide help to non-human bodies; the amount of participation and data-collection that occurs during the pop-up clinic and exhibition will be a measure of inter-species empathy on campus, and depending on how widely-distributed the project becomes, hopefully, perhaps on an even larger geographical scale.

The theoretical nature of empathy has been an integral component that informed the participatory and relational aspects of the *Community Bee Clinic*. Ethologist Frans de Waal divides empathy into emotional and cognitive channels, respectively. The emotional or "bodily" channel of empathy consists of synchrony, motor mimicry, and emotional contagion (e.g., I yawn if you yawn), while the higher-order, cognitive channel of empathy is enacted actively through behavior such as other-orientation, perspective-taking, sympathetic concern, sharing, and targeted helping.[11] These latter, cognitively-based enactments of empathy are woven into the conceptual configuration and process of the honeybee project. Through the undertaking of the nursing protocol, participants are compelled to enact these mental and behavioral channels of compassion: other-orientation, sympathetic concern, and targeted helping. In prompting these actions, the *Community Bee Clinic* functions not only as experimental system, but also as a kind of empathetic

system, prompting and propagating empathy through active participation.

VI. Contemporary Art Contextualization: Biopolitical Practices

The Community Bee Clinic project shares a kinship with the work of artists who explore non-human systems, subjectivities, and ecologies—conceptual sites of inquiry rather than formally or materially-defined ones. More specifically, I see *The Community Bee Clinic* as existing in the contemporary conversations of Sci-Art—art that takes up technoscience as its medium of aesthetic, ethical, and philosophical investigation, reconciling two vastly different research methodologies into interdisciplinary projects. Many artists have wrestled with the boundaries of art and science before me, and I am indebted to the artistic lineages which originated with their work. I see my projects as being in conversation with the explorations of Kathy High, Natalie Jeremijenko, Rachel Mayeri, Pinar Yoldas, Beatriz da Costa, Heather Dewey-Hagborg, Suzanne Anker, the Critical Art Ensemble, Helen Mayer and Newton Harrison, Fritz Haeg, and Ian Ingram.

Additionally, the project has an undeniably political bent. It is a synthesis of not only science and art, but also action. The participatory aspect of the project is predicated on embodied engagement with lived realities in the external world, rather than being relegated to the insular white cube of the gallery. This immediate, interventionist approach feels increasingly important, even indispensable, in the looming uncertainty of the Anthropocene. Articulating bodies toward each other is always a political question about collective lives, and I am interested in how actions and attunements affect the myriad beings we share our planet with. I feel an affinity

toward other artists engaged simultaneously in both technoscientific discourse and politically-oriented art. What follows below is an attempt to situate my own practice alongside those biopolitical practices of similar cultural producers and seminal figures in the contemporary art world.

The *Community Bee Clinic* shares a close kinship with two of Kathy High's interrelated projects, *HLA-B27* and *Embracing Animal.* In these multimodal, conceptual works, High cohabitated with transgenic rats who were genetically-altered to share the same autoimmune disease that she, too, suffered from.[12] Taking form as an interspecies installation, *Embracing Animal* was a public site of exchange between people and rats, just as the *Community Bee Clinic* is an installation of interaction and exchange between honeybees and human beings. High also chronicled the lives and deaths of her transgenic companions, just as I have recorded the bodily trajectories of the bees with whom I have worked. High's documentation took form as a compilation of different writing, reflections, interviews, and a photo series, *HLA-B27*. [13] Her notion of alter-kinship, in which members of an ordinarily-reviled, misunderstood species can become valued family members—this re-evaluation of care, and who/what we deem worthy of it, is just as pertinent to High's work as to my own. Additionally, her project's deeply personal and narrative quality is one that I see mirrored in my own practice time and time again. Temporally-based works, collaborative works, and works based on the interactions of living bodies in temporary configurations—these kinds of practices always seem to demand the diaristic and the touch of the autobiographical.

The *Community Bee Clinic* installation has a whimsical quality upon first glance—it is characterized by the sensibility of "playing doctor" and by the preciousness of the objects in the space. However, despite its initial cuteness, it is backed by research that illuminates global environmental problems. Also operating at the intersection of ecology, social practice, engineering, and activism, is the ambitious work of Natalie Jeremijenko. At New York University, Jeremijenko's *Environmental Health Clinic* "prescribes" ways for community members to improve local environmental health through data collection, urban interventions, and referrals to environmental organizations—measures directed toward improving local ecological health.[14] Some of these interventions have included walkable Tadpole Strollers that enable volunteers to test local water quality, along with written publications such as *The Biotech Hobbyist,* in which Jeremijenko and other contributors presented tutorials for D.I.Y. artistic-scientific experiments, complete with step-by-step instructions and advice.[15] Like Jeremijenko's *Environmental Health Clinic*, *The Community Bee Clinic* involves the appropriation of the clinic concept, however, reimagined for invertebrate patients, and for the sake of asking questions about our moral circles and care ethics: which bodies deserve our attention and empathy? Which bodies deserve systematized medical care? Furthermore, like the *The Biotech Hobbyist's* tutorials, amateurism and citizen science projects have also been integrated into my own conception of a radical veterinary clinic. The honeybee first-aid kits offered at the exhibition include step-by-step instructions and materials for resuscitating any wayward pollinator that an amateur bee medic might stumble upon.

In a similar vein, Beatriz da Costa and Critical Art Ensemble are also influential Sci-Art figures whose artistic research I have felt a special kinship with. Da Costa's *PigeonBlog* project investigated interspecies exchanges by employing trained carrier pigeons (fitted with transmitter backpacks) to test air quality in urban environments. The collective she was part of, Critical Art Ensemble, frequently engaged the public through workshops that translated challenging new technical and scientific developments into something accessible to a general public.[16] For example, *Free Range Grains* involved testing crops brought into the gallery for common genetic modifications. Via participatory, amateur experiments, Critical Art Ensemble demystified specialized knowledge, recontextualizing scientific methodologies in a public art context in order to edify, or call attention to socio-political and public health issues.[17]

In *Tactical Biopolitics: Art, Activism, and Technoscience*, Beatriz da Costa delineates how powerful such research tools, methods, and objects can be when they are re-purposed to raise awareness of social or environmental issues. Operating as a sort of inverse-technology, the honeybee I.C.U.s in my own thesis exhibition function in a similar way. Utilitarian, reverse-engineered chicken egg incubators and recognizable medical paraphernalia are used to draw attention to imperiled bodies and ecologies. A critical edge has been smuggled into recontextualized objects.

The works of High, Jeremijenko, da Costa, and the Critical Art Ensemble are all reliant on public participation. The operations of the *Community Bee Clinic* are the same; audience members are invited to become active agents within the work, taking responsibility as part of collective, public experiments. The collectivity in this

mode of making is empowering and cathartic for me, as it subverts those felt crises of agency that seem to dominate our minds when confronted with widespread environmental problems. I can only hope that others feel similarly empowered, or at least moved, when they participate in the process that I've developed.

VII. Contemporary Art Contextualization: Time-based Media

Reverse Apitherapy: Collected Patient Histories (2018-2019) is a short, experimental documentary film that captures the essence of the work done within the walls of the Community Bee Clinic, portraying the dire conditions of its incoming patients, along with their treatment, and their outcomes. The video piece is about loss, about fragility, and about the corporeal tribulations of the honeybees as living, sentient subjects. Non-human animal subjectivity has a long history of being represented in time-based media, and I am heavily indebted to historical filmmakers in this territory, beginning with early figures such as Jean Painlevé. His sincerity, scientific-poetic sensibilities, and his credo, "science is fiction," have all been formative in my own thinking about how we construct authenticity in our representations of animals' interior worlds. Additionally, other notable figures such as Diana Thater and Rachel Mayeri—whose *Primate Cinemas* project humorously inverted the human-chimpanzee relationship—also operate in this same conceptual territory, exploring non-human subjectivity, perception, and meaning-making through time-based media.

Reverse Apitherapy was also heavily inspired by the filmmaking strategies and themes of intimacy portrayed in Heather Dewey-Hagborg's short film, *T3511*: a post-

genomic love story about "a biohacker who becomes increasingly obsessed with an anonymous donor whose saliva she purchases online." [18] *T3511* was an inspiring cinematic experience for me on an affective level. It was visceral, intimate, and raw in its documentary portrayal of Dewey-Hagborg's real-life investigations into genomic sequencing and the commodification of human biological materials. She successfully took subject matter that is ordinarily abstract and inaccessible—sequencing the human genome—and made it tangible through diaristic details and confessional-style letters to her saliva donor. The personal narrative was engrossing, drawing me into the very real pitfalls and politics of commodified human fluids and biological privacy issues. I thought that if Dewey-Hagborg could create such a gripping experimental documentary about genetic testing, I could attempt to infuse just as much tenderness and intimacy into my own biomedical honeybee drama.

VIII. Historical Contextualization: Blurring Boundaries Between Art and Life

The honeybee work can also be contextualized through the work of two historical 20th century figures: Allan Kaprow and Hélio Oiticica. Because the work relies on embodied experience for its activation, it is a material experiment in perception, operating within the realm of direct, every day, and ephemeral relations. This kind of work owes no small debt to the rich lineages spawned by Kaprow and Oiticica. Kaprow's Happenings and Environments in the 1960's were an investment in blurring the boundary between art and everyday life. Art's fundamental nature shifted with Kaprow. No longer an object to be viewed on a pedestal or behind a picture frame, it could be almost anything, from sounds, scents, and movements; to a landscape of

rubber tires to be danced upon; to an assortment of sugar, wax, and heat leveraged to revive an insect.

Similarly, Helio Oiticica's massive environmental installations, particularly *Eden*, served as indirect inspiration for the logic underpinning the public Community Bee Clinic installation. *Eden* was a "multisensorial environment which... effectively domesticized public space by offering an inviting environment where people could relax and play."[19] Importantly, there were radical impulses associated with such work because it "insinuated an alternative politics based on participation through sensorial experience," and "assigned primacy to the experience of the spectator-participant who would participate actively in the production of meaning."[20] The overarching aim of the honeybee project is much the same, but with an interspecies-bent; it is meant as a celebration of bodily autonomy, agency, and sentience.

Conclusion

The Community Bee Clinic is a synthesis of science, action, and art. The various facets of the project serve to index the material-semiotic conditions of colony collapse and environmental degradation, capturing our particular, ephemeral, and loaded moment in history. Cumulatively, the aesthetic, symbolic, and affective dimensions cumulatively function to weave the project into artwork. The relational aesthetics embedded within imbricate the work more specifically into social practice, while its relationship to micro-utopias and non-human subjectivity situate it within speculative design. Conversely, laboratory collaboration, citizen science, and the application of species-specific perceptual and sensory information weave the

project into the discipline of biological science. Its features, operations, and the dialogue it produces qualify it as an experimental system in its own right, and the cumulative experience of participating in the rescue process is meant to evoke an affective response, a newfound visual sensitivity toward life on a diminutive scale, and an impulse toward care—in short, an experimental test of the bounds of human empathy.

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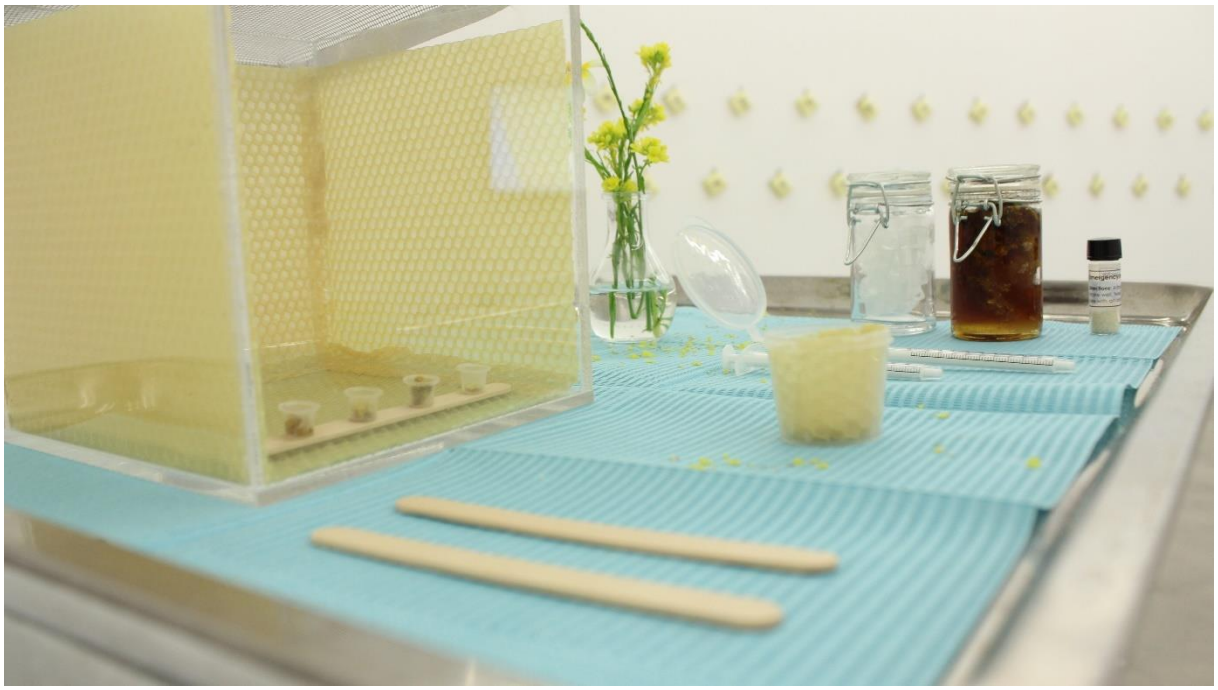
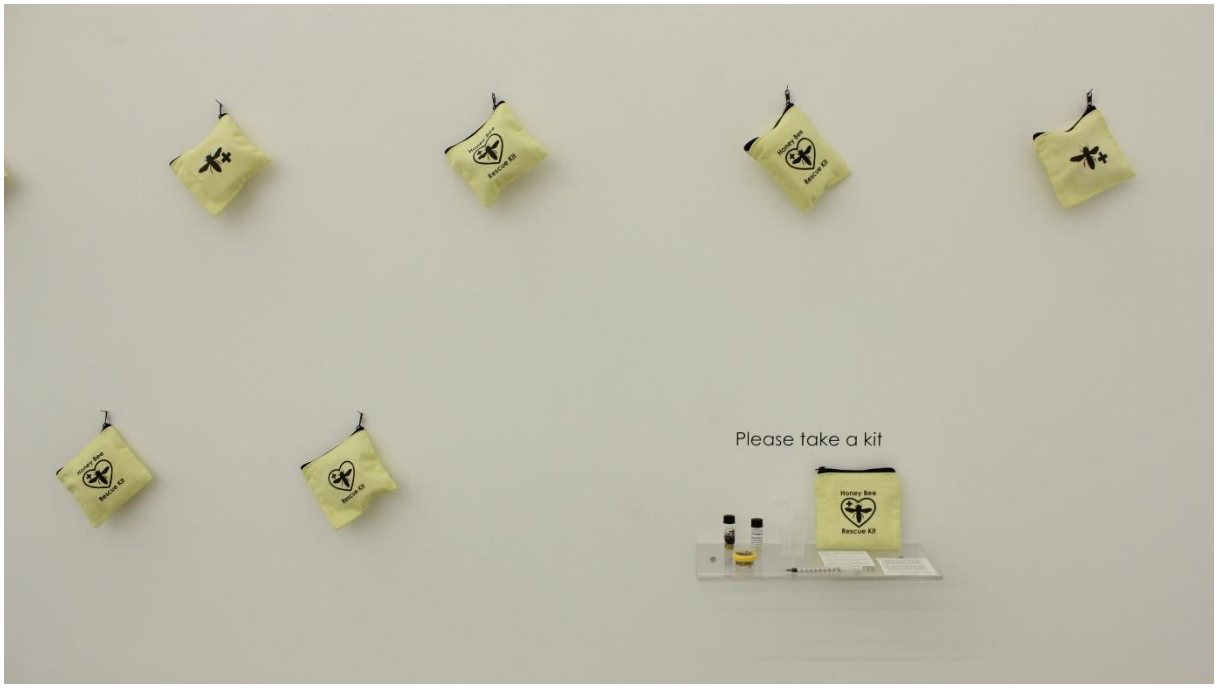
Thesis Exhibition Documentation:

Photographed: material traces of colony collapse, or the suspended ruins of a honeybee hives that have died off.


The Community Bee Clinic



The interactive honeybee nursing stations at the pop-up Community Bee Clinic.



Free, take-home do-it-yourself bee rescue kits offered to visitors.