Max Berger
April 23rd, 2015
IP Thesis

TEND: *a Re-Experiencing of the Switch*

Intro

Think of objects not as instruments for our use, but as entities that are effectively linked to us and that need care. Associate objects that are inanimate and easily ignored, such as a spoon, with a living organism such as a tree. Inanimate objects deserve the same care, respect, and attention as living organisms receive. Objects are as beautiful and useful as living ones; they endure, perform services and require care. Objects are our kin. Even more so, the more seamlessly integrated objects are, the less 'designed' they seem and therefor the less noticeable they become. TEND (see fig. A) is piece that seeks to literalize this disjunction by turning the experience of an inanimate object into that of a living organism. I am disrupting the interface between humans and ubiquitous objects in order to emphasize the value of mundane things and acts: With TEND, I have done this by profoundly reconstructing the experience of switching on a light.

Creative Work / Process

I am creating a lighting feature that incorporates characteristics of bioluminescent organism light actuation to accentuate the act of turning on and off a light. Dinoflagellate bioluminescent light is activated when the single celled protist's cell wall is pressed up by turbulent seawater. The result is a brilliant blue light that appears to emit from the sloshing liquid. Unlike traditional incandescent and fluorescent light bulbs in the modern home, bioluminescent light is not a product of a rocker switch at a

room's entryway. Nor is it connected to energy driven out from millennia-old pockets of sunshine beneath the earth. Instead, Pyrocystis fusiformis's light is a product of biological caregiving. Installed in a home, it must be fed and watered, much the same way we 'tend' our pets. During the day, while the organisms are on their sleep cycle, they absorb the sun's energy and turn it into luciferase to be expelled in the form of light when the sun goes down and they wake up. Microbiologists believe they evolved this brilliant talent for a nighttime light show as a kind of biological "burglar alarm." They are able to ward off potential predators with their flashing light.

TEND is a tabletop light. In order to turn it on, the user must nudge it enough to make the water inside the glass vessel turbulent. The turbulent water will then illuminate and glow bright until the lamp sways to a stop and the water becomes still, causing the lamp to go dark. Merely agitate it once more and the light will turn on again. This semi-living lamp requires care and attention to function; it also requires a physical and delicate touch. Deciding on the way in which the lamp would move was the most difficult part in moving forward, as I had to evaluate the level of turbulence in the water with the form. I had to consider scientific design, user experience design, and aesthetics in such a way that all advantages were met.

To aid in this decision-making process I worked alongside doctoral students and professors in microbiology and turbulence experts at the University of Michigan to discern glass forms that would meet these direct and varied needs. There were two glass forms that were most successful, in that they were intuitive for the light-seeker to experiment with, and provided an environment in which the organism could thrive (see

fig. B). I designed kinetic lamps around these glass vessels. There were four lamps that I was most passionate about. It was difficult to work through them to select the one I would execute most carefully for the exhibition. The difficulty stemmed from how hard they were to successfully model and prototype. Often times I had to build them full scale to understand their kinetics. This was important for one of my designs (see fig. C), as it was only at full scale that I realized it would not sway up and down as hoped. I had to rely on my instinct in order to make decisions about how they would move. I was unsure about some design's stability (see fig. D) and other's duration of motion (see fig. E). Ultimately, to decide which lamp to build I selected the one that would rock the longest and be the most readable from afar. In order to construct the final product I worked with University of Michigan chemistry glassmakers, engineering professors, as well as experts in bronze casting. It was necessary to work in glass, as it was one of only a few materials that would not contaminate the organisms. I used bronze for the foundation because it was important to me that the form was one material and bronze was the only material that would allow me to do so without expensive tooling.

The most arduous part of the process was learning how to best care for the organisms that inspired the lamp. When exposed to human touch, the Pyrocystis fusiformis become contaminated and their death grows imminent. These semi-living sculptures must be kept in sterile incubators and immersed in nutrient media, or else they become fatally infected by the bacteria and fungi, that live in the environment and on humans. After understanding how to work with the organisms on a primary level, I flipped their circadian rhythm so I would be able to work with them during the day. I

then began running a series of experiments to see if I could prolong the duration of their light. I tried adding fertilizer (this made them grow in higher quantity, but resulted in colony collapse), adding luciferase enzyme into the seawater media (which made them glow brighter for longer but was exorbitantly expensive), and adding a weak acid (which had them actuate more readily but resulted in cell death). Despite these setbacks, I was determined to work with these organisms because I wanted to create an evocative object that required care to function and survive. Eventually I learned to use them just as they had evolved without any of my biological amendments. Finally, having mastered their care in my studio lab in this way, I was able to apply them, as a medium, to my design process.

Eventually, it became obvious that the dinoflagallates would exhaust their light-making enzyme too quickly for it to be readily viewable in a gallery. Instead, I rigged TEND to function exactly the same way as bioluminescence but with an electronic light system. A sensor tells if there is turbulence in the water and in turn actuates the LEDs that dim up on actuation and then back down when the turbulence in the water seizes. In order to provide a medium for the light to emanate from I made the seawater murky and white. This surrogate-ness of real bioluminescence is important as a stand-in for the exhibition because it's the successful animation that captures the life of this piece. This would become entirely lost without this electronic emulation. Though, there is no living dinoflagallates inside TEND as a final installed product, it still functions the same as it needs to be tended for to function.

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Contextual Discussion

My aim was to build a functional and necessary object that required conscious engagement. Humans have a tendency to overlook well-designed objects and take them for granted. Consider our relationship with screws, doors, sinks, or clocks. The way we use them—thoughtlessly, automatically—is part of what being human is. After all, we cannot pay attention to every single aspect of daily life. This variation in attention is a big part of conscious life.

In contemporary life the light switch has become ingrained in the individual psyche and worked into our muscle memory so much so that its use almost never rises to the level of consciousness. While a child who hasn't developed these filters might still, flip lights on and off as fast as they can, shake an uneven table, or enjoy the motion of swinging back and forth on a jungle gym, adults hardly ever engage their surroundings this way.

TEND makes us pay attention to our relationship with mundane acts, such as activation, and encourages us to look more inquisitively at how we have adapted over the decades. Unlike a switch, TEND can be appreciated from afar. What to do with TEND only become clearer as you get closer—the lamp comes without instructions so the user must learn without prompts, requiring a certain level of meditative thinking. You must reach out to touch the lamp, to see how it can move, sway and rock. It is this retro and analog flow of thought that turns the whole lamp itself into a switch—the whole lamp becomes the occurrence of turning on a light. In this way, the light is secondary, and its actuation primary.

Historically, humanity has always found creative ways to employ lighting systems in homes. Eskimos use one sheet of precious, clear lake ice to allow light to flow through their igloo ceiling while still separating them from the elements. Electrical wiring in homes before the 1930s used ingenious pulley systems to pull socket cords to doorframes or to the bottom and top of staircases (see fig. F).

There is a tradition of designers who disrupt the interface between humans and ubiquitous objects. In his piece, Screw :), Komuro Seisakusho (see fig. G) simply replaced the head of a screw with a smiley face (as opposed to a Philips head). Ever since its invention, the screw has maintained a relatively uniform style and function. Like lights and switches, screws are used everywhere but are easily overlooked. With his piece, Komuro brought attention to them. Not only can these screws be used as tools, they can also prompt the joy of discovering and sharing small surprises with others. A second example is Klemens Torggler's Evolution Door (see fig. H), a door that is entirely re-experienced in how it futuristically opens sideways like unfolding origami. Another example is Sunsill by Lucy Norman (see fig. I), in which her brilliantly designed indoor lighting uses sun-tracking technology and mirrors to bring sunlight into a room more effectively. A final example is a work called Biolight, engineered by Phillips the lighting company (see fig. J). Phillips uses bacterial luminance to create this futuristic lighting feature. It differs from mine in that Biolight uses bacterial luminescence. Bacterial luminescence can't be turned on or off, and instead is always on. Each of these artists uses design to redefine the mundane. They show that even objects that have become omnipresent can still be made unfamiliar and new. Their designs help us question why

things are the way they are and help us see that the world around us is more much more plastic than we realize.

Conclusion

As adults, we rarely engage the familiar world with wonder. Like young children, dinoflagellates need this rocking (turbulence) to live. TEND tempts the prehistoric, infantile, and subconscious, the deepest instinctual memories of waves and rocking. The light is turned on with a push – the light remains on only until the lamp stops rocking. TEND not only emphasizes the value of caring for our objects, it brings back the forgotten gestures that make people happy.

Light stops us like it does a deer in the headlights. Light creates wordless thought, like when we drift off, gazing into a fire. It is not difficult to understand our primal relationship to light. Today those of us in the developed world don't even think about switching on the lights above our heads. TEND uses the switch to strengthen our relationship with light. It brings us back to forgotten gestures that encourage us to revel in the amazement that is a well-designed switch.

TEND not only makes you think about our relationship with our environments, it projects into the future and helps us understand how we may one day define human-ness. TEND helps us think of objects not just as instruments for our use, but also as things that are effectively linked to us and that need care. It helps us to think of objects as beautiful and useful, like the trees in your own garden; it helps us conceive of objects as things that endure and have lives of their own, objects that perform services and

deserve care. Objects are our kin. We cannot converse with them, but we can interact in infinitely various ways.

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Figure A
Max Berger
TEND

Figure B
Glass forms for turbulence

Figure C
Failed full scale test

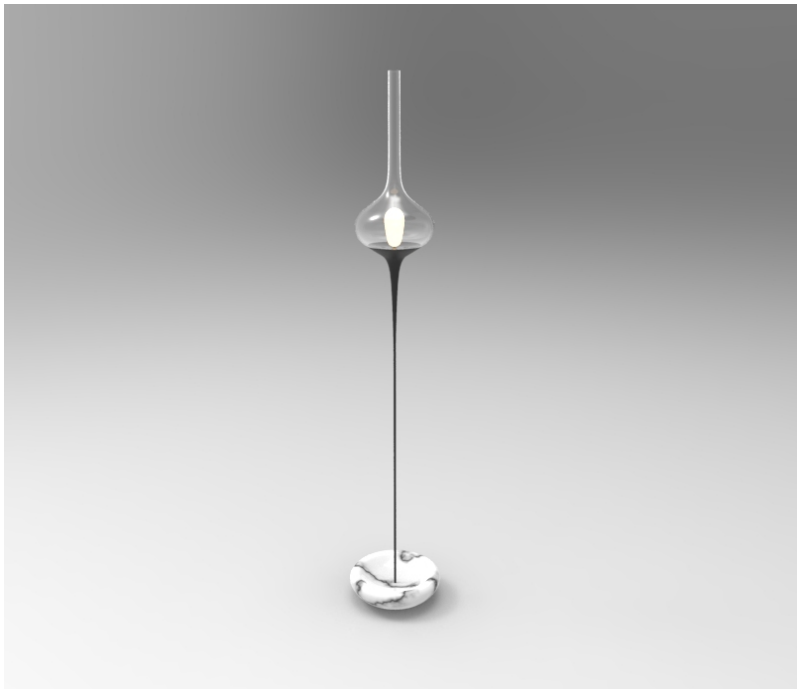

Figure D
One of the final options but had unstable potential

Figure E
One of the final options but might not have rocked long enough

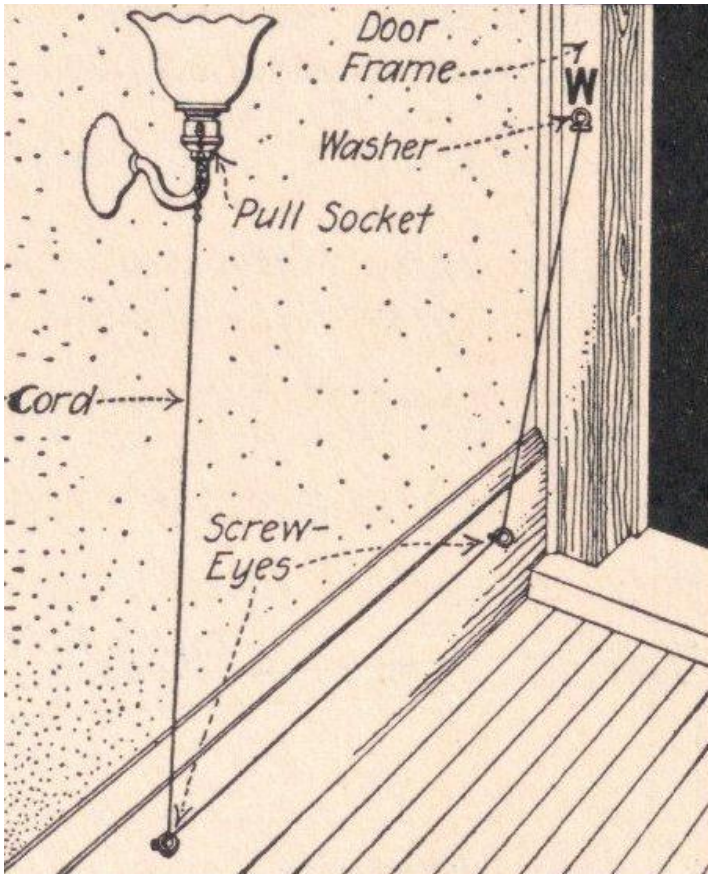

Figure F
1920s GE advertisement

Figure G
Yuma Kano
Screw ☺

Figure H
Klemens Torggler
Evolution Door

Figure I
Lucy Norman
Sunsill

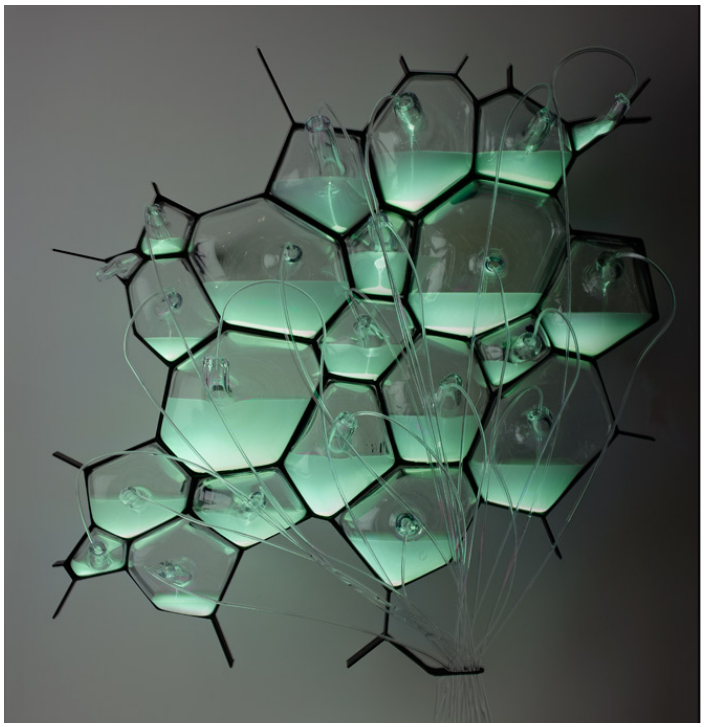

Figure J
Philips
Biolight