Cultivation by Fluorescence:
Light, Color, and Tetsumi Kudo

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Abstract

This thesis examines the material histories of artificial plants, fluorescent dyes, and the electronic circuitry alongside close readings of artworks by Japanese-born artist Tetsumi Kudo (1935-1990). Kudo interrogates notions of ecological collapse and techno-organic hybridity through hybrid environments which consist of vibrant plastic flowers and kitschy zombie organs interwoven with transistors and circuit boards. I argue that Kudo's visions of mutated ecologies are entrenched in the legacies of heliotropic pursuits of knowledge, imperial botany, and electronic technologies, each of which engage with visibility and legibility in different ways. I treat darkness and invisibility as a site of possibility that mirrors the qualities of fluorescent colors, which owe their dazzling brightness to the absorption and reflection of invisible ultraviolet light, in addition to light from the visible spectrum. Ultimately, I propose fluorescence as a method of analysis which foregrounds zones of invisibility or nothingness. Reading objects through fluorescence, that is, by locating latent excesses hidden within illuminated surfaces, offers alternate modes of legibility that emerge from the radiant threshold between the visible and invisible.

Cette thèse examine l'histoire matérielle des plantes artificielles, des colorants fluorescents et des circuits électroniques à travers les œuvres de l'artiste d'origine japonaise Tetsumi Kudo (1935-1990). Kudo interroge les notions d'effondrement écologique et d'hybridité techno-organique à travers des environnements hybrides composés de fleurs en plastique vibrantes et d'organes de zombies kitsch entremêlés de transistors et de circuits imprimés. Je soutiens que les visions de Kudo sur les écologies mutantes sont ancrées dans les héritages des poursuites héliotropiques de la connaissance, de la botanique impériale et des technologies électroniques, chacune d'entre elles s'engageant dans la visibilité et la lisibilité de différentes manières. Je traite l'obscurité et l'invisibilité comme un site de possibilité qui reflète les qualités des couleurs fluorescentes, qui doivent leur luminosité éblouissante à l'absorption et à la réflexion de la lumière ultraviolette invisible, en plus de la lumière du spectre visible. En fin de compte, je propose la fluorescence comme méthode d'analyse qui met en évidence les zones d'invisibilité ou de néant. Lire les objets à travers la fluorescence, c'est-à-dire en localisant les excès latents, offre d'autres modes de lisibilité qui émergent du seuil radiant entre le visible et l'invisible.

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I dedicate this thesis to my beloved and brilliant grandfather (1936-2025).

Introduction

In 1960, Japanese-born, Paris-based artist Tetsumi Kudo (1935-1990) expressed a strange sentiment regarding his use of color. He said, "In my work, color is neither beauty nor taste but 'dash' against 'dots', or '-' against '+' ... Color doesn't bear a meaning for its own sake."[1] Color, it seems, operates in a binary mode for Kudo. While conventionally understood as part of a spectrum or imbued with symbolic or psychological force, in Kudo's formulation, color does not refer to meaning itself. Rather, the artist repeatedly suggests that color acts as a medium for information and action. This binary conception of color, therefore, considers color as a locus of possibility that either elicits a reaction or dissolves into the background. The artist's colors are consistently fantastically fluorescent and impossible to ignore. Fluorescent colors yield powerful affective responses, inciting attraction, fear, aversion, or alertness. They are associated with psychedelic and punk subcultures and are used by the military, color consumer goods, and illuminate storefronts. In Kudo's sculptures, fluorescent organs and melting plants encased in glowing microhabitats are sites of impossible absurdity and radioactive danger.

The artist's most important works come from his series *Cultivation by Radioactivity* beginning in 1967 and *Pollution – Cultivation – New Ecology* of the early 1970s. The sculptures in these series clearly exploit themes of environmental collapse and the degradation of human bodies, made explicit in iterations which include zombified hands and penises clawing up from the earth. Kudo's work has thus been examined extensively as prescient ecocritical meditations on the culture of destruction typically associated with Western powers. The artist's imagery – zombie organs and melting flowers sprouting from electronic circuitry – also maps onto the discourses of cybernetics, posthumanism, and new materialism that overwhelm contemporary

[1] 工藤哲巳, 国立国際美術館 (Japan), 東京国立近代美術館, 青森県立美術館, Tetsumi Kudō, Kokuritsu Kokusai Bijutsukan (Japan), Tōkyō Kokuritsu Kindai Bijutsukan, and Aomori Kenritsu Bijutsukan. *あなたの肖像 : 工藤哲巳回顧展 = Your Portrait : A Tetsumi Kudo Retrospective*, 65.

culture. The resonances between this context and today's climate crisis may account for the re-entry of the artist's work into the cultural milieu of the last fifteen years.

Much of the contemporary relevance of Kudo's work derives from the ecological stance taken in his 1971 manifesto, "Pollution – Cultivation – New Ecology," in which he denigrates the European humanist impulse and proclaims that in "the swamp of polluted nature and decomposing humanity," we must identify a new ecology within a process of metamorphosis that includes humans, nature, and technology.[2] This manifesto's sentiments are remarkably similar to contemporary themes of hybridity and the dethroning of myopic systems of resource extraction and distribution. Because Kudo offers spirited visions of a metamorphosed technological world, such environment-inflected analyses dominate the critical writings about his work. But as he was conceiving of a binary understanding of color, a decade before his techno-organic musings took fluorescent shape, Kudo's choice colors were black and white. At this point in time, the early 1960s, Kudo selected the phrase 'philosophy of impotence' to begin articulating the problems that his 1971 manifesto sought to address. This philosophy of impotence suggests that the cultural drive towards production and accumulation is a fundamentally fruitless project, exemplified by masculinist and anthropocentric frenzies towards procreation.

In his artworks, Kudo conveyed this theoretical perspective using the form of castrated penises. Since university, Kudo was involved in the Anti-art movement in Japan and participated in the ongoing *Yomiuri Indépendants Exhibition*, preparing seven solo shows over a five-year period.[3] Kudo was a key figure in this anti-establishment arts space, in which the Anti-art artists largely incorporated found objects or 'junk' in their works. Early contributions by Kudo such as

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[2] Tetsumi Kudo, "Pollution – Cultivation – New Ecology," in *Tetsumi Kudo: Garden of Metamorphosis*, ed. Doryun Chong, (Minneapolis, Minn.: Walker Art Center, 2008), 131.

[3] 工藤哲巳, 国立国際美術館 (Japan), 東京国立近代美術館, 青森県立美術館, Tetsumi Kudō, Kokuritsu Kokusai Bijutsukan (Japan), Tōkyō Kokuritsu Kindai Bijutsukan, and Aomori Kenritsu Bijutsukan. *あなたの肖像 : 工藤哲巳回顧展 = Your Portrait : A Tetsumi Kudo Retrospective*. (Ōsaka: 国立国際美術館 : 公益財団法人ダイキン工業振興財団, 2013), 77.

Proliferous Chain Reaction in X-Style Basic Substance (1960) (Figure 1) consisted of scrub brushes and rubber gloves, selected for their urchin- and amoeba-like forms. In 1962, at the fourteenth installment of the *Yomiuri Indépendants Exhibition*, Kudo presented *Distribution Map of Impotence and the Appearance of Protective Domes at the Points of Saturation* (Figure 2), also referred to as *Philosophy of Impotence*. The work occupied an entire room of the exhibition venue and consisted of a knotted grid of thick, black thread and single black, phallic objects suspended from the web and walls. Some of the forms contained small light bulbs embedded in the tips, while others were encased in plastic 'protective domes'. A number of the penises dangled from the ceiling like a bunch of over-ripened bananas, leading to a giant pink penis draped across the floor and expelling a mass of udon noodles (which eventually spoiled and had to be replaced with white string).[4] Amidst the ejaculatory mess, Kudo placed photographs of icons of Western creative freedom, including images of Jasper Johns' famous 'target' paintings. The installation overtly and comically desexualized the sex organs. And as part of a group of artists known for their use of junk, Kudo's proliferous field of severed penises demoted the organ's status to peers with the array of garbage presented elsewhere in the exhibition. Working between crude humor and overt disgust, *Philosophy of Impotence* articulated the absurdity of the phallus as the symbolic mechanism of power and procreation. Specifically, the phallus operated as a symbol of accumulation, commodification, and proliferation, signalling what the artist saw as the demise of humanity.

Kudo pushed this grotesque, fruitless, even rotten characterization of the symbol of masculinist agency further in a number of Happenings. In May of that year, 1962, Kudo won the grand prize at the *2nd International Young Artists Pan-Pacific Exhibition*, which relocated him

[4] 工藤哲巳, 国立国際美術館 (Japan), 東京国立近代美術館, 青森県立美術館, Tetsumi Kudō, Kokuritsu Kokusai Bijutsukan (Japan), Tōkyō Kokuritsu Kindai Bijutsukan, and Aomori Kenritsu Bijutsukan. *あなたの肖像 : 工藤哲巳回顧展 = Your Portrait : A Tetsumi Kudo Retrospective*, 77.

from Japan to Paris. By fall, Kudo performed *Philosophy of Impotence* at *To Conjure Away the Spirit of Catastrophe* (Figure 3) hosted by Jean-Jacques Lebel, a key proponent of Happenings in Europe, in which he bound himself in white rope while holding an oversized penis likely used in his installation at the *Yomiuri Indépendants Exhibition*. With constrained movements, he raised the penis above his head as though engaged in an act of worship before collapsing to the floor. The event was attended by giants like Allan Kaprow, who wrote about the performance in his foundational 1966 book *Assemblages, Environments, and Happenings*, and Kudo quickly made a name for himself in the Paris art world, presenting his works alongside the likes of Joseph Cornell, Marcel Duchamp, Robert Rauschenberg, and Daniel Spoerri.[5]

The subsequent Happenings and performances for which Kudo was initially known built upon the *Philosophy of Impotence* installation, which insulted the masculinist anthropocentrism that composed the single-minded procreative and commodified human drive, in both Europe and postwar Japan. Impotence, for Kudo, appeared to be a solution to what he considered enslavement: "the human mechanism, the human thought mechanism, and the social and historical mechanisms are all slaves to the preservation and survival of the species."[6] Dethroning the phallus and rendering it useless would, in curator Keiji Nakamura's summation, "emancipate humans from this state of enslavement to the preservation of seeds," a state which has commodified even emotion and the senses.[7] Contrary to the sexual revolutions of the decade, wherein artists like Carolee Schneemann, who staged *Meat Joy* (Figure 4) in Paris also with the

[5] Allan Kaprow, Jean-Jacques Lebel, Wolf Vostell, George Brecht, Kenneth Francis Dewey, Milan Knížák, and Gutai Bijutsu Kyōkai. *Assemblage, Environments & Happenings*. New York: Harry N. Abrams, Inc., 1966.
[6] 工藤哲巳, 国立国際美術館 (Japan), 東京国立近代美術館, 青森県立美術館, Tetsumi Kudō, Kokuritsu Kokusai Bijutsukan (Japan), Tōkyō Kokuritsu Kindai Bijutsukan, and Aomori Kenritsu Bijutsukan. *あなたの肖像 : 工藤哲巳回顧展 = Your Portrait : A Tetsumi Kudo Retrospective*, 94.
[7] Nakamura Keiji, "Kudo Tetsumi," in *Tetsumi Kudo Retrospective: Contestation/Creation*, (Osaka, Japan: The National Museum of Art, 1994), 12.

support of Lebel, espoused celebrations of the flesh, the untethered penis signalled for Kudo not a liberatory Eros, but an ascetic sort of Thanatos.

Kudo likened himself to an observer or a journalist, suggesting a placeless objectivity that belies his foreigner status, likely exacerbated by his limited fluency in the French language. The years between his formulation of a philosophy of impotence and his proclamations for a new ecology were tumultuous. Kudo took part in movements leading up to the events of May 1968 in Paris and conveyed with hope that "it will be necessary to adopt the intuitive hypothesis of the young generation – young artists, students, etc."[8] At an epicenter of counter hegemonic action, however, Kudo's sense of solidarity waned, and an "unbearable sense of solitude" as an "exiled artist in a foreign land" took its place.[9] It was at this time that Kudo found an escape route in the form of an artist residency at the Stedelijk Museum in Amsterdam. His so-called journalism took place remotely, culminating in a work named *Cultivation by Radioactivity in the Electronic Circuit* (1968) (Figure 5), an elevated wooden display case described as a hothouse containing several slimy brains sitting in a shallow pool of goo. It was Kudo's first work to be collected by a museum and is now emblematic of his corpus, which is saturated with hothouses, aquariums, and terraria containing penises, brains, eyeballs, and elements of electronic circuitry. Kudo's vision of a fruitless, impotent future developed into these artificial microenvironments, and abject blacks and whites were traded in for blinding fluorescent paints. With this turn in his career, severed organs no longer loom ominously from above or initiate physical pseudo-religious struggle. Instead, they are safely sequestered away as they mutate into irradiated and

[8] Kudo, "Pollution – Cultivation – New Ecology," 131.
[9] 工藤哲巳, 国立国際美術館 (Japan), 東京国立近代美術館, 青森県立美術館, Tetsumi Kudō, Kokuritsu Kokusai Bijutsukan (Japan), Tōkyō Kokuritsu Kindai Bijutsukan, and Aomori Kenritsu Bijutsukan. *あなたの肖像 : 工藤哲巳回顧展 = Your Portrait : A Tetsumi Kudo Retrospective*, 176.

technologized forms, their supernatural hybridity made hypervisible by the use of fluorescence and blacklight.

Kudo wrote in a 1966 letter to longtime supporter and collector W.A.L. Beeren, "Still, it is difficult to see the situation of metamorphosis concretely. Therefore, we need a portrait that can translate that condition with concrete and symbolic elements… My main concern is 'observation'."[10] Fluorescent colors are a key operant in Kudo's imperative to observe. Their extreme saturation demands attention, seen in *Cultivation by Radioactivity in the Electronic Circuit* or various iterations of his *Pollution – Cultivation – New Ecology* series. Kudo sprays fluorescent paints all over the place, scattering the surfaces of his sculptures with blaze orange, signal green and aurora pink, three signature colors produced by the Day-Glo Corporation, the fluorescent pigment pioneer.

First developed in the 1930s, fluorescent pigments inherited the legacy of 19th-century synthetic dye production, in which enchanting new colors emerged out of darkness. Their invention was spearheaded by Robert Switzer, an American chemistry student, who suffered an accident while unloading crates at his grocery store job. The accident severely impaired his vision, and he was confined to dark rooms to convalesce. While in recovery, Robert and his brother Joseph developed a fascination with ultraviolet light's interactions with the chemical solutions sold at their father's drugstore. The inspired Switzer brothers purchased chemistry sets, a common American toy at the time, to make paints that could glow in the dark. Eventually, they developed a formula which would allow colors to glow even in daylight. These were the first

[10] 工藤哲巳, 国立国際美術館 (Japan), 東京国立近代美術館, 青森県立美術館, Tetsumi Kudō, Kokuritsu Kokusai Bijutsukan (Japan), Tōkyō Kokuritsu Kindai Bijutsukan, and Aomori Kenritsu Bijutsukan. *あなたの肖像 : 工藤哲巳回顧展 = Your Portrait : A Tetsumi Kudo Retrospective*, 153.

fluorescent paints, later named Day-Glo. By 1949, the Switzer brothers patented their paints, and just a few years later, Day-Glo hit the American mass market to great success.[11]

Fluorescent Day-Glo colors like those used in Kudo's sculptures owe their dazzling brilliance to their ability to absorb and reflect light not only from the visible light spectrum, but also from ultraviolet rays. They bring invisible light to our field of vision, emitting up to three times more light than ordinary colors.[12] Only these pigments allow our perceptual systems to register ultraviolet light. The value of fluorescent colors, therefore, is derived from a manipulation of otherwise unusable materials, operating in extension with 19th-century synthetic dye manufacturing, which chemically transformed black coal tar – earth's innards digested and excreted by industry – into a synthetic rainbow of consumer goods. Following the historical industrial waste-based derivation of synthetic colors, fluorescent colors could capitalize on a previously latent energy. Ultraviolet light could now be treated as a plentiful yet invisible untapped resource. Further, the system of metabolizing ultraviolet light grants fluorescent colors the ability to change in appearance depending on their light source. They behave unlike typical colors under blacklight; for example, the mixture of red and blue yields 'brown', rather than purple (Figure 6).[13] Synthetic colors were thought to be improvements of the natural world, substances of artifice and substitution, but fluorescents contain no mimetic pretenses. They offer an expanded visual field marked by superfluity and a maximized extraction of ambient resources – resources that were once inaccessible, unknowable, locked in darkness.

The ultraviolet radiation emitted by fluorescent colors is made more visible under the ultraviolet radiation emitted by blacklights. The characteristic glow of fluorescent colors

[11] Carolyn Kane, "Synthetic Fluorescents: From Day-glo from Novelty to Norm," *Journal of Design History* 27, no. 3 (2014), 263.
[12] Kane, "Synthetic Fluorescents," 268.
[13] Kane, "Synthetic Fluorescents," 257.

therefore results from access to invisible light at two different registers, first through the condition of the colored objects themselves, and second through the environment in which they are displayed. Together, ultraviolet light emanates, composing an irradiated, unearthly atmosphere that inverts visuality under typical conditions. Under blacklight, things like human skin or architectural features dissolve into darkness, while fluorescent pigments become even more blinding to the eye. Blacklight environments coax vibrancy out of darkness and thereby offer a foil to normal conditions of looking. "Though invisible to the human eye," says Denise Ferreira da Silva, "ultraviolet radiation turns opaque things into luminous ones. In other words, blacklight does not illuminate: it makes things emanate or shine."[14] Ferreira da Silva offers blacklight as a black feminist poethical device that can 'make shine' forms of colonial violence that are already known but paradoxically obscured by the transparency given by concepts and categories. In the case of Kudo, blacklight makes shine the ways in which visual and informational plenty originates from perceived absences. This inversion evinces how the categories of light and darkness are fundamentally unstable and explains how questions of truth and artifice cannot be tethered to either condition. Invisibility, like darkness and like the black waste of industry that yielded synthetic colors to begin with, reveals itself as a site defined by a style that exceeds representation.

Kudo's binary treatment of color as vehicles for meaning presents itself in the function of the '+', rather than the '-', but what fluorescent color accomplishes is not exactly an expanded or accumulative visibility. Instead, fluorescent color, in relocating invisible light into the visible spectrum, actually replaces traditional forms of visuality. Fluorescence and blacklight can be read in terms of what Akira Mizuta Lippit calls 'avisuality'. By weaving the materialities of

[14] Denise Ferreira da Silva, "Blacklight," in *Otobong Nkanga, Luster and Lucre*, ed. by Clare Molloy, Philippe Pirotte and Fabian Schöneich (Berlin: Sternberg Press, 2016), 245.

psychoanalysis, x-ray, and cinema, his 2005 book *Atomic Light (Shadow Optics)* defines avisuality as the following:

> Avisuality not as a form of invisibility, in the sense of an absent or negated visibility: not as the antithesis of the visible but as a specific mode of impossible, unimaginable visuality. Presented to vision, there to be seen, the avisual image remains, in a profoundly irreducible manner, unseen. Or rather, it determines an experience of seeing, a sense of the visual, without ever offering an image. A visuality without images, an unimaginable visuality, and images without visuality, avisuality. All signs lead to a view, but at its destination, nothing is seen. What is seen is this absence, the materiality of an avisual form or body.[15]

Avisuality offers a mode of visibility that is not nuanced by the other senses, such as hapticity, but by a materiality that is impossible to grasp through optics alone. Instead, avisuality is given in the form of excess that takes place within the visible. The phenomenon of fluorescence and blacklight stages "a conflict of dark and light: deep, invisible interiority and vast, overexposed exteriority. Secret avisuality and excess visibility."[16] I therefore propose fluorescence as a mode of avisuality because it stores and reveals the irretrievability of ultraviolet light by materializing it as an alternate and excessive form of colored light.

Kudo's sculptures give the atmospheric and affective effects of fluorescent color shining in blacklight as a way to read further into the latencies hidden in their aesthetic forms. His transmogrified, irradiated ecological systems appeal to the eye via a sense of strange and unfamiliar beauty. Beauty does not refer to appearance but an essence, because "beauty is truth become visible," explains Walter Benjamin.[17] Beauty is not a condition of the surface, as in a veil; rather, "the beautiful is neither the veil nor the veiled object but rather the object in its veil…Since only the beautiful and outside it nothing–veiling or being veiled–can be essential, the

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[15] Akira Mizuta Lippit, *Atomic Light (Shadow Optics)* (Minneapolis, Minn.: University of Minnesota, 2005), 32.
[16] Lippit, *Atomic Light*, 124.
[17] Walter Benjamin. "Goethe's Elective Affinities," in *Walter Benjamin: Selected Writings, Volume 1, 1913-1926*, ed. by Marcus Bullock and Michael W. Jennings (Cambridge, Massachusetts; London, England: The Belknap Press of Harvard University Press), 350.

divine ground of the being of beauty lies in the secret. So then the semblance in it is just this: not the superfluous veiling of things in themselves but rather the necessary veiling of things for us."[18]

The hypnotic vibrancy of fluorescent color is not merely the splattering of paint, but the very essence of Kudo's artworks themselves. He delivers us his objects 'in their veil', in their co-constitutive forms that excise forms of light that are inaccessible to our view. The combination of ultraviolet-enhanced fluorescent color and transformative emanation under blacklight makes perceptual nothings glow. Fluorescing objects make themselves visible or known in a completely different register that transcends mere appearance. They contain a dual visuality that varies depending on whether they are seen in normal light or ultraviolet. The ultraviolet light stored in fluorescent color reflects in only one form at a time, but both forms are openings into a visual field that would otherwise be unavailable to us. Blacklight tubes that radiate invisible light do not hide the other face of fluorescence. They 'make shine,' in Ferreira da Silva's words, morphing objects into a form more brilliant yet equally foreign in origin.

Fluorescence therefore offers a mode of reading objects not through their surfaces and not through accumulative systems of knowledge, but rather through sites of darkness, nothingness, or inaccessibility that reveal themselves in avisual forms. Fluorescence recuperates impossible latencies and makes them legible without ever closing the distance between representations and referents. It makes shine visual systems that are enclosed with multiplicities that expand inwards through condensation. Fluorescence as a method for looking presents possibilities for examining bounded and mutual systems not through denuding or excavating or supplementing surfaces, not by digging deeper or applying other perceptual senses, but by meeting unattainable secrets where they are. Fluorescence does not attempt to make incompatible forms cohere into mutant forms. It

[18] Benjamin, "Goethe's Elective Affinities," 351

makes things glow, radiate, and exceed normal looking by engendering modes of sensing the avisual already present within the visible.

In order to engage with the use of fluorescence, this paper first addresses the lack of scholarly attention to Kudo's use of artificial plants. Part One considers Kudo's use of artificial flowers, which can be found extensively throughout his body of work. The artificial flower takes on a synecdochal position in this reading of Kudo's work by gesturing towards the oppositions of light and dark that engenders a synthetic ecology that is indifferent towards heliotropic metaphors for truth and meaning.

The second part of this paper links Kudo's hothouse sculptures to the longer history of imperial botany and the use of Wardian cases, a type of sealed plant box that greatly facilitated colonial agricultural and cultural production. To my knowledge, this connection has not been made in the existing body of research on this artist. This section takes this oversight as an opportunity to examine the legacies of colonial ordering and natural history implicit in Kudo's collections of artificial life. It focuses on the artist's sealed environments that house fake plants and examines the relationship between space and appearance.

Part Three explores Kudo's use of transistors to propose a refusal of accumulative forms of information storage suggested by plant boxes and museum displays. This section treats his sculptures as models inspired by electronic circuitry, rather than hybrid environments that can be visually parsed into discrete components, in order to describe how an intensified, compressed structure can fruitfully oppose modes of seeing premised upon expansive, territorializing frameworks.

Part One: Flowers

Flowers are a recurring motif in Kudo's work, presented in the exaggerated colors which make them so appealing to consumers. His sculpture series titled *Pollution – Cultivation – New Ccology*, which began in 1971, consists of vibrant botanical dioramas and flowerscapes. In one example from 1971 (Figure 7) (hereafter referred to as *Three Flowers* to avoid confusion with other works of the same title), the sculpture is displayed upon a white plinth. Its rectangular base is made of a humble dark wood and is piled high with soil. Three flower stems rise from the dirt, their pink and white bulbs drooping dramatically towards an imaginary sun-filled window. The blooms sag with fatigue and pity. Beneath, milky beige goo creeps down the flowerbed, picking up the sheen from the lightbulbs overhead. We step closer, circumambulate, and perhaps lean in with our noses for a whiff of wet earth or floral fragrance – wishful thinking. The soil is artificial, as are the flowers, which we notice have dripped downwards like candle wax. Caked in melted plastic and mucus, rocks and fallen petals laze among a smattering of a strange sort of seedling: thin, wiry electronic transistors.

By the time Kudo made this sculpture, artificial flowers were primarily made of polyester and other plastics, materials whose genealogies link them to industrial extraction from the depths of the earth: oil, "the black corpse of the sun."[19] The flowers in *Three Flowers* are colored with synthetic dyes, whose magically brilliant qualities historically obscured their dark, coal-based conditions of production while enhancing the saturation and variety of the commercial visual field. Synthetic dye production signalled a major shift towards a waste-derived "parallel world, a second nature – artificial colours, then later textiles, substances, any matter of materials," says Esther Leslie in her 2005 book *Synthetic Worlds: Nature, Art and the Chemical Industry*, which

[19] Reza Negarestani, *Cyclonopedia: Complicity with Anonymous Materials* (Re.press, 2008), 12.

addresses how synthetic substances materialized largely through the chemical manipulation of waste.[20]

In the 19th century, the hungry coal-based industries excreted coal tar in abundance. This byproduct was used in the manufacturing of steel, but in Germany, where coal was the principal resource commodity, something had to be done about the wealth of this waste. In 1832, chemist Friedlieb Ferdinand Runge was appointed technical director of a chemical factory owned by the Prussian Royal Maritime Trade Society.[21] There, Runge was tasked with investigating the properties and potential uses of coal tar, a stinky black liquid. In an 1833 attempt to eliminate its odor, Runge combined the coal tar with aqueous calcium chloride. The experiment failed to remove odor, but the substance transformed into a deep blue color. He called it blue cyanol, the world's first synthetic blue.[22] That same year, Runge used coal tar again, this time mixed with chloride of lime, to coat his fence and hopefully keep the neighboring dogs away. Instead, the dogs returned to urinate on the fence, resulting in a chemical reaction that yielded a more brilliant semi-permanent blue he named Kymol.[23]

Runge had formulated the blueprint for the chemical manufacture of other new colors, and years later in 1856, William Henry Perkin distilled a purplish color, Tyrian Purple or mauve, now largely considered the first synthetic color ever made despite Runge's precedence. Though a chemist by trade, Perkin abandoned his research for industrial colors manufacturing.[24] By the turn of the century, manufacturers had transformed black tar into pigments like magenta, fuschine, and safranin. Synthetic textile dyes were more potent and long-lasting than traditional dyestuffs, and the expenses and colonial holdings required to produce colors from indigo,

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[20] Esther Leslie, *Synthetic Worlds: Nature, Art and the Chemical Industry* (London: Reaktion, 2005), 78.
[21] Leslie, *Synthetic Worlds*, 50.
[22] Leslie, *Synthetic Worlds*, 51.
[23] Kane, "Synthetic Fluorescents: From Day-glo from Novelty to Norm," 259.
[24] Leslie, *Synthetic Worlds,* 76.

madder root, and cochineal could be replaced with the inexpensive chemical manipulation of trash.[25]

This transformation of sensory undesirables into substances of visual novelty was as serendipitous as it was groundbreaking. Remember that the chemist Runge's initial goal was an olfactory transformation of stinky coal tar, not aesthetic. It was by happenstance that unpleasant odor transmuted into attractive color, forming a continuum between the senses of smell and sight. Sensorial experience, it seems, encompassed a broader, communicable system between external matter and embodied perception. Heather I. Sullivan terms this relational system an ecology of colors, derived from Johann Wolfgang von Goethe's 1810 treatise *Towards a Theory of Color*. For Goethe, color constitutes our visual world as the interfacing of light, matter, and perception. Sullivan's ecological formulation therefore understands color as the result of an active, reciprocal, and fluxing process in which light "never exists without being in space, time, and a world populated with material things and perceiving beings."[26] Tim Ingold shared this sentiment in 2000, writing that "light is the *experience* of inhabiting the world of the visible, and that its qualities – of brilliance and shade, tint and colour, and saturation – are variations upon this experience'" (original italics).[27]

But as Sullivan also points out, Goethe sees the relationship between light and dark as a conflict, and color is the outcome of their "battle," in which, unsurprisingly, light is the champion.[28] Or, in Hans Blumenberg's terms: "in the essence of light, darkness is destroyed and

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[25] Leslie, *Synthetic Worlds*, 77.
[26] Heather I. Sullivan, "The Ecology of Color: Goethe's Materialist Optics and Ecological Posthumanism," in *Material Ecocriticism*, ed. Serenella Iovino and Serpil Oppermann (Bloomington: Indiana Univ. Press, 2014), 88.
[27] Tim Ingold, "Descartes," in *The Perception of the Environment: Essays on Dwelling, Livelihood and Skill* (New York: Routledge, 2000), 264- 265.
[28] Heather I. Sullivan, "Revolutionary Optics and the Anthropocene," *Eighteenth-Century Studies* 51, no. 1 (2017), 118.

overcome."[29] In his 2016 book *Artificial Darkness: An Obscure History of Modern Art and Media*, Noam M. Elcott explains that for Goethe, blackness signals a "state of repose," while white contains potentialities for "excitations."[30] Elcott also provides a review of other 19th-century theories of color, which consistently pose darkness or black as a condition of negativity or nothingness. If black does indeed refer to a stasis, evacuated by defeat and aesthetically void, Runge's chemical experiments on industrial waste evidence how that inherent negativity can itself be a site of possibility, not foreclosure.

So, while the transformation of black gunk to prestige blue did occur by happenstance, the fabrication of the rest of the rainbow mirrors the longue durée of 'overcoming' black by the power of light. In *The Accursed Share*, Georges Bataille formulates the sun in terms of abundance and generosity as a model for his general economy. But rather than "a dazzling superabundance, as well as an indefinite, omnipresent brightness containing all," as Blumenberg has put it, Bataille later cites Aztec human sacrifice to suggest that the sun's offerings are extensions of its own hunger.[31] Amanda Boetzkes elaborates on how his conception of the sun mirrors capitalist logic:

> ...Bataille teases out a bi-directional relation from the concept of consumption: it is at once the excess energy that must be expended and the excessive desire to consume in order to generate that excess energy. The incandescence of the sun gives generously but equally burns within living organisms as a demand to be fulfilled, like the predatory hunger in the tiger's eyes… It is not the sun, but Bataille's mythologization of it in the face of restricted economies of knowledge that is the fulcrum of expenditure.[32]

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[29] Hans Blumenberg, "Light as a Metaphor for Truth," in *History, Metaphors, Fables: A Hans Blumenberg Reader* (Ithaca, NY: Cornell University Press, 2020), 133.
[30] Noam Milgrom Elcott, *Artificial Darkness : An Obscure History of Modern Art and Media* (Chicago: University of Chicago Press, 2016), 31.
[31] Blumenberg, "Light as a Metaphor for Truth," 131.
[32] Amanda Boetzkes, "Cold Sun • Hot Planet: Solarity's Aesthetic, Planetary Perspective," *South Atlantic Quarterly* 120, no. 1 (January 2021): 93.

While Boetzkes' proceeding argument locates planetary possibilities within the articulation of 'solarities', in our current examination of color, sunlight reflects the sense of discovery associated with the synthesis of a second nature. The synthetic manufacture of natural dyes did not satiate desire; soon, natural materials like desirable woods, ivories, and gemstones were faked, too.

Color had defeated the black excesses of coal industries, but that victory enabled further accumulation by meeting a central demand of industrial capitalism: the re-entry of the excrement of industrial consumption back into the processes of economy, and according to Karl Marx, "without any previous outlay of capital, [creating] new matter for capital."[33] The invention of synthetic dyes therefore enshrined altered ecologies of colored vision directly cultivated by the mechanisms of value. In this industrial color ecology, black was not nothingness, but a powerful latency enlightened by enterprise.

This enlightening of black into color falls in step with our heliotropic systems of knowledge which conflate light with truth and progress. It also demonstrates the alignment between scientific discovery with the accumulation of capital, in which the color black spurned a polychromatic "second nature" that not only invented new product colorways, but oriented entire industries towards empirical manipulations of organic life. Laura Anne Kalba argues in her book *Color in the Age of Impressionism: Commerce, Technology, and Art* that colorful commodity culture and floriculture were inextricably linked in 19th-century France. The flower industry at this time mirrored the trend-driven fashion industry, and consumers were most drawn to new and eye-catching colors. Horticulturists worked towards hybrid variants, imbuing the limited lifespans of cut and live flowers with the fleeting frivolities of fashion. Chemist Michel-Eugene Chevreul advanced gardening as a science, insisting that such an approach would yield greater

[33] Karl Marx, *Capital, Vol. 1*, 663-4.

control over the appearance of cultivated flowers, which he believed should be understood "first and foremost through their colors."[34] This sort of empirical horticulture privileged aesthetics, presenting consumers with an array of blooms that turned with the trends faster than the flowering seasons.

As the production and consumption of flowers intensified in saturation and spectrum, the artificial flower industry began producing *fleurs de fantaisie*, or "imaginary flowers which had no equivalent in nature."[35] Prior to this obsession with impossible colors, the French artificial flower industry in the 18th century privileged realism and was closely tied to developments in botanical classification systems and growing colonial interests in exotic plants.[36] But it was France's *fleurs de fantaisie* which incited the expansion of artificial flower production into other Western countries. An 1849 entry in the *Scientific American* notes that the French were the most "ingenious" in the artificial flower industry, and an 1891 article explains that American artificial flower makers delegated the dyeing process to "usually a Frenchman or a German learned in the art of mixing colors."[37] And with the outbreak of the Great War, the German industry had infiltrated the French monopoly throughout Europe, indicating the widespread popularity of well-made artificial flowers.[38] The extractivist implications of this colorful flower craze will be discussed later in this paper, but for now, it seems the black source material of coal tar played an originary role in the development of a more colorful commodified sphere populated by vibrant fake flowers. In other words, the black nothingness of industrial waste reared the rainbow of

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[34] Laura Anne Kalba, "Chapter Two. From Blue Roses to Yellow Violets: Flowers and the Cultivation of Color," in *Color in the Age of Impressionism: Commerce, Technology, and Art* (University Park, USA: Penn State University Press, 2017), 47.
[35] Kalba, "From Blue Roses to Yellow Violets," 60.
[36] Zara Kesterton, "Artificial Flowers in the Credit Records of an Eighteenth-Century French Fashion Merchant," *The Historical Journal* 67 *(2024)*: 974–1003.
[37] "Artificial Flowers." *Scientific American* 5, no. 13 (1849): 99. http://www.jstor.org/stable/26135827; "Artificial Flowers." *Scientific American* 5, no. 13 (1849): 99. http://www.jstor.org/stable/26135827.
[38] "German Artificial Flower Industry." *Journal of the Royal Society of Arts* 70, no. 3644 (1922): 767. http://www.jstor.org/stable/41355954.

synthetic colors that enabled fakeries and substitutions of the natural world, revealing how visual splendor is inextricable from material darkness.

Kudo's fake flowers retain the vibrant coloration that drove the flower industries since the 19th century with a heightened degree of realism achieved by the malleability of plastics. This sense of realism is unique to *Three Flowers*. Elsewhere, Kudo consistently deploys readymades and replicas in all their artificial glory. *Souvenir* (Figure 8) from 1967, for example, is a literal potted plastic plant, caked in fluorescent green paint to a papier-mache-like effect. Or in a different diorama from the *Pollution – Cultivation – New Ecology* series, flowers and zombie penises entwine with silver wires and electrical cords (Figure 9). But in *Three Flowers*, artifice initially appears as a coincidence of the medium, rather than a concern of subject matter. The flowers are perhaps undernourished in their shallow, shoebox-sized flower bed, or maybe the soil simply needs hydrating, but the sculpture nevertheless suggests a living, growing micro-environment sustained by earthworms and snails.

The initial confusion between live specimen or plastic replica is reinforced by the atmosphere of the contemporary art gallery which blurs what is real and what is not. Visitors are primed to suspend disbelief in the presence of fakes, and deception is rarely met with surprise. *Three Flowers* appears at first glance to be a true replica of a living flowerscape adorned with unfamiliar slimes, and this proximity to realism is precisely what begs closer looking. The traces of heat that have subtly melted the plastic petals reveal the flowers' man-made composition, and only by association can we assume that the soil in which these flowers are planted might also be fake. Hovering between real and representation, the sculpture appears as earthly as it is oily.

The downwards gesture of these flowers, given by an external heat source or a false sun, challenges metaphors of light as a source of energy or growth. Turning towards light for growth

or expansion refers to a closed and self-reflexive metaphorical system. Jacques Derrida writes in "White Mythology: Metaphor in the Text of Philosophy," "Metaphor therefore means heliotrope, both movement turned to the sun, and the turning movement of the sun."[39] By this he means that the sun, as the object which renders the oppositions between visibility and invisibility, knowledge and non-knowledge, is always already metaphorical and already artificial. He questions: "[I]f the sun is not entirely natural, what can remain in nature that is natural? The object [the sun] which is the most natural in nature has in itself the capacity to go out of itself; it joins with artificial light, it suffers eclipse and ellipse, has always itself been other."[40] The flower, then, itself a heliotropic object, occupies a synecdochal position by standing in for the limits of metaphoricity and the elisions contained within illumination that is presumed to be natural.

Analyzing flowers in Derrida's thought, Michael Marder explains that the flower fulfills a sacrificial function, severed first through its representational difference that subjects it to cultural life and second through the act of cutting by the human hand.[41] The cut natural flower is itself denatured, suspended between artifice and organicity. Kudo's *Three Flowers* negotiate this rhetorical position. They would be perfect replicas of live flowers were it not for their meltiness. And despite their plastic composition, they do not undergo that second severing; on the contrary, they have been planted tenderly and cared for by fake fertilizers. This sculptural ecosystem therefore exceeds the self-referential circuits of heliotropic metaphor. If 'natural' cut flowers are already also artificial, especially when histories of botanical experimentation, colonial extraction, and industrial production have nurtured them, then they are necessarily suspended between both conditions. But plastic flowers that are planted in fake soil and indifferent to an imaginary sun

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[39] Jacques Derrida, "White Mythology: Metaphor in the Text of Philosophy," translated by F. C. T. Moore, *New Literary History* 6, no. 1 (Autumn, 1974): 52.
[40] Derrida, "White Mythology," 53.
[41] Michael Marder, "Derrida's Sunflowers," in *The Philosopher's Plant: An Intellectual Herbarium* (New York Chichester, West Sussex: Columbia University Press, 2014), 199.

are naturalized into artificiality. They do not whither, they melt. They are not frozen in a circuit of decomposition but rather caught in an act of manipulation. The forms stretch and expand, having shifted from solid to liquid back to solid again. What *Pollution – Cultivation – New Ecology* stages is not flora denatured, because they were never nature in the first place.

In an essay in his edited volume *Why Look at Plants?: The Botanical Emergence of Contemporary Art*, Giovanni Aloi contends:

> "Artificial plants are all surface in every sense… Their fabric leaves and plastic stems metaphorically encapsulate the essential economies of desire of the plant/human relationship they stage: forever green, in perennial bloom, in full form all year 'round—they aesthetically disavow death while being nothing more than perennially nonliving."[42]

Negotiating the nature of artificial plants, Aloi argues, occurs at the level of superficial appearance. "Forever green," their color marks their fixed surrogate status, and the simultaneous disavowal of death and posturing of life reflects Kudo's early notion of impotence as a failure that persists. Impotence suggests a persistence in spite of futility, a spillage of not seed but udon noodles that spoil. A fake flower may fool a pollinator, but the actual pollinating function is not only fruitless, but nonexistent – impotent. An artificial flower has no need to pollinate. It is already emancipated from the social, historical, and structural mechanisms that are, to repeat Kudo's words, "slaves to the preservation and survival of the species." So, while Boetzkes (by way of Bataille) names the sun's dual nature of abundance and accumulation, and while culturally, light is equated with recognition, knowledge, and being, the fake flower inhabits an artificial darkness in which such conceptions of light do not cohere. It occupies a metaphorical darkness which is "ontically and ontologically impotent."[43] And that darkness, initially treated as a site of nothingness, instead offers a condition of possibility.

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[42] Giovanni Aloi, "(Brief) Encounters," in *Why Look at Plants?: The Botanical Emergence in Contemporary Art*, ed. Giovanni Aloi (Leiden: Brill Rodopi, 2019), 232.
[43] Blumenberg, "Light as a Metaphor for Truth," 135.

By distilling a nonreproductive ecology through the motif of the fake flower, Kudo suggests that artifice can be understood outside of organic assumptions. The synthetic status of artificial greenery and colorings directs evaluation away from a comparative mode, in which fakes strive to be better than the real thing. Instead, the plastic flower's melty disposition speaks to a longer history of extracting novelty from waste. The fake flower performs a constitutive act of refusal to the organic process of growth and decay, and this disruptive essence communicates artificiality in non-oppositional terms. To treat Kudo's flowers as simply artificial, rather than non-organic or mimetic, means that their sculptural habitats exist in a material dimension of artifice, as well. Because the flower is one of the smallest units in Kudo's sculptures, the artist's expanded visual vernacular can be atomized into terms of artifice alone, remitting presumptions of verisimilitude.

Part Two: Environments

"[T]echnology has subjected the human sensorium to a complex kind of training," proclaims Walter Benjamin in his oft-cited essay "On Some Motifs in Baudelaire," so much so that many contemporary attempts to dissolve binaries such as nature/artifice or man/technology nevertheless depend on such bifurcations.[44] Kudo's sculptures often reflect on this circularity too, wherein themes of techno-organic optimism abrade against unsightly renderings of hybridity. *Grafted Garden/Pollution–Cultivation–New Ecology* (1971) (Figure 10), for example, blatantly forgoes harmony. While the artificiality of *Three Flowers* inheres in spite of its first-glance organic appearance, *Grafted Garden* offers no such pretenses. This large-scale installation consists of two perfectly angular rows of tilled soil, erupting with vibrant red, orange, and yellow blossoms. Each row of dirt is obviously composed of three distinct segments placed flush against

[44] Walter Benjamin, *Illuminations* (New York: Shocken Books, 1968), 175.

each other with no apparent attempt at contiguity. Decaying hands and calcified penises in gray and puce emerge haplessly from the soil to meet light bulbs and giant vacuum tubes. This section of the garden is somewhat cute, the contrast between summery colors and cartoonish organs made even more playful by the addition of a wooden sign labelled "Grafted Garden" in pink hand-painted letters. What makes the work truly freakish, however, is the addition of six tubular metal structures each mounted on a square of turf. They look like simple coat racks, but affixed to each end are more severed body parts, like entire forearms and a leg amputated at the mid-thigh. The limbs have been MacGyvered into place with thick black thread and strips of bandage-like fabric. They are decorated with short strands of fake ivy, and the tops of the metal structures are similarly crowned with tufts of thick plastic foliage. In the very back, the face of a balding man hangs from a metal pipe, looking down to the garden below. And on the structure beside him lives a mop of black hair in place of greenery (if only the wig had been installed just one column over…).

Grafted Garden is typically installed against a wall, and the single frontal viewpoint promotes a visual flattening of these discrete parts. The sculpture might be described as 'picturesque', offering a vista that is "like a picture."[45] This ridiculous picturesque presents a hybrid landscape composed of mass-produced artificial foliage, hand-sculpted body parts, metal pipes, and electronic components in a twisted, technological evocation of colonial gardens populated by transplants from all over the world. Man, nature, and metals live together in the fake garden scene, interwoven in dissonance. Jill H. Casid's notion of the 'imperial picturesque' comes to mind here, which describes the colonial practice of generating "a discourse of aesthetic and political control for the translation and forcible reshaping of the foreign and exotic into the

[45] Jill H. Casid, *Sowing Empire: Landscape and Colonization* (Minneapolis: University of Minnesota Press, 2005), 45.

familiar and the tamed."[46] Casid's book *Sowing Empire: Landscape and Colonization* details the colonial landscape as a site of both agricultural and racial production in 18th-century British and French conquest. The imperial picturesque depends on the naturalization of global transplants, in order to cultivate landscapes primed for plantation slavery and reinforce the authority of the metropole. These landscapes were necessarily aesthetically compelling, in order to posit exotic amalgamations as technological advancements and expansions of natural order of living things. A comment from British painter George Robertson illustrates the diversity of transplanted plants in Jamaica, stating that they "all together compose[d] an embroidery of colors which few regions can rival."[47]

This emphasis on visual harmony in spite of the speciated difference traced by colonial botanists transforms space into documents of history. In *The Order of Things*, Foucault says: "herbariums, collections, gardens; the locus of this history is a non-temporal rectangle in which, stripped of all commentary, of all enveloping language, creatures present themselves one beside another, their surfaces visible, grouped according to their common features, and thus already virtually analysed, and bearers of nothing but their own individual names."[48] Kudo's *Grafted Garden*, too, is a 'non-temporal rectangle' of sorts, in which each category of object floats within artifice, formally suspended between some state of virtual growth, decay, or stasis.

Grafted Garden meets the condition of colonial landscapes as "always already like a painting," because though it is ostensibly a three-dimensional sculptural installation, the experience of viewing the work threads the various linear elements into a disorienting plane of stuff.[49] What the installation seems to document, however, is not exactly the transplant of exotic

[46] Casid, *Sowing Empire*, 47.
[47] Casid, *Sowing Empire*, 11.
[48] Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (London: Routledge, 2005), 143.
[49] Casid, *Sowing Empire*, 13.

plants onto colonized soil, but the grafting of the components that comprise the "primitive antagonism" at the heart of human conception. Kudo's 1971 manifesto declares: "The primitive antagonism = humanity against nature, humanity against animals, humanity against the machine (instrument)... In our history this antagonism has made a complicated and interesting NET."[50] While the manifesto proceeds to describe the interpenetration and mutual decomposition of these antagonistic factors as the formation of a new ecology, Kudo also admits that "it is very difficult to remove the sentiment of privilege (human dignity) and the sentiment of colonialism from the head of humanity."[51] *Grafted Garden* cannot possibly be mistaken for a natural site of metamorphosis, for anything but a privileged site of human intervention and organization. Unlike other examples from the *Pollution – Cultivation – New Ecology* sculpture series which stage deformation under the pretense of spontaneity, this freakish installation is a spatial documentation of forced hybridity.

Kudo pushes against naturalization even further in his extensive collection of hothouses, aquariums, and terraria. These sculptures, unlike the open-air dioramas of *Pollution – Cultivation – New Ecology*, are contained structures. In 1972, at his sprawling solo show at Amsterdam's Stedelijk Museum, one of the exhibition's four rooms called *Your Hothouse, Your Aquarium, Your Cage* contained an array of these artificial habitats arranged like a biologist's laboratory, an eclectic pet shop, or a natural history museum (Figure 11). Plexiglas tanks lined the walls, each crowned with their own short blacklight tube. The final installation successfully realized the layout pictured in Kudo's preliminary sketches (Figures 12-13). The contents of these microhabitats veer further into the absurdity broached in *Grafted Garden*. One untitled work from 1971 (Figure 14), for example, is a cheap-looking plastic tub lined with a meager layer of

[50] Kudo, "Pollution–Cultivation–New Ecology," 130.
[51] Kudo, "Pollution–Cultivation–New Ecology," 130.

squishy fake soil. A cactus pad painted a dinosaur-ish green and studded with what look like the shanks and tips of metal nails stands lopsidedly behind a cluster of baby white flowers. In front lives a spindly pink sea urchin, and a vacuum tube and colony of transistors crop up on the opposite side. The tank houses two creatures: a pimply, kelly green toy frog and a psychedelically fluorescent penis laying prone upon the dirt. This work, like the others displayed in the exhibition room, stage hybridized scenes of nature, coaxing desert plants and ocean beings and severed organs to huddle together in cramped fish tanks. The forced hybridity inherent to *Grafted Garden* is rendered here not as a picture to be viewed, but as specimen to be read.

The garden and the type of laboratory-cum-natural history museum shown in *Your Hothouse, Your Aquarium, Your Cage* mirror the replacement of spectacularized "circular" displays of things to their arrangement on a "table."[52] Foucault clarifies: "What came surreptitiously into being between the age of the theatre and that of the catalogue was not the desire for knowledge, but a new way of connecting things both to the eye and to discourse. A new way of making history."[53] That new way of making history enabled 19th-century historians to implant language upon the orderly systems of classification established in the century prior. Natural history endeavors to close the distance between language and things, "so as to bring language as close as possible to the observing gaze, and the things observed as close as possible to words. Natural history is nothing more than the nomination of the visible."[54] So Kudo, by organizing his variety of creatures in the style of natural history diorama displays, indexes the anatopism inherent to notions of a new historical ecology. That new ecology is to arise in the "swamp of 'polluted nature' and 'decomposing humanity',"[55] but sculptures like this tank

[52] Foucault, *The Order of Things*, 143.
[53] Foucault, *The Order of Things*, 143.
[54] Foucault, *The Order of Things*, 144.
[55] Kudo, "Pollution–Cultivation–New Ecology," 131.

suggest that pollution may not solely refer to contaminants from industrial irresponsibility. In these aquariums, pollution also looks like composite environments assembled by human hands. These scenes of forced hybridity indeed offer "small-scale models" of a prospective new ecology, thereby giving representation to an intermixing that is fantastically unnatural. Like *Grafted Garden*, there exists no illusory unity within the tanks. However, when taking in the room in its entirety, a similar naturalizing phenomenon seen with *Three Flowers* occurs. Like the artificial flowers that showcase their own conditions of manipulability, the room at the Stedelijk Museum generates a visual language that reaches as close as it can to the materiality of the things it describes. The coexistence of disparate beings suggested inside a single tank is flattened into a singular state of artifice when the objects are cataloged beside each other, constituting an spatial body of formal dissonance. And because the room is called *Your Hothouse, Your Aquarium, Your Cage*, we are implicated in this display. Our own bodies comprise yet another element that belongs precisely in its unbelonging.

To better understand how the viewer functions as a central component in the naturalization of hybridity into artifice, consider one of the centerpieces of the exhibition room, a larger-scale sculpture that glows in radioactive green (Figure 15). *Cultivation by Radioactivity in the Electronic Circuit* (1969) (Figure 16) (hereafter referred to as *Eyeball Farm*), one of Kudo's most celebrated works, is a sculpture of a hothouse mounted on wooden legs at a scale not unlike a museum display case holding archival materials. The structure has been sloppily sprayed with fluorescent green paint, fogging up the perimeters of the plexiglas case. Inside, plastic eyeballs sprout from artificial grass, sowed alongside upright transistors (Figures 17-18). The fusion of disparate elements, organic and technological, is even more apparent in this sculpture. Kudo asks

us to imagine the interior as an agricultural site that cultivates two modes of metabolizing energy: vision and the amplification of electrical current.

Of course, the hothouse's seedbed is artificial and far too shallow to sustain any imaginary root system beneath the eyeballs and the transistors. Still, the crops appear to be flourishing, eyeballs like autumn pumpkins ready for harvest and transistors like stalks of corn. The farmer has employed an intercropping system, a method of planting multiple crops in one plot to achieve greater yield. Intercropping supports the health of all varieties involved in a mutual agreement of sustenance and protection. Eyes and electronics cohabitate this hothouse, both feeding on a shared system of energy transmission via light and kept warm by the suggestion of an internal heating system.[56] With illumination as fertilizer, the transistors amplify the input into this new perceptual system, perhaps even counteracting the threat of metabolic rift. Though tinged with fabricated danger, inside this plexiglas case, a polyculture thrives.

This reading of the sculpture responds to the cornucopian ideology that pervaded colonial economies which promised endless growth. Historian Fredrik Albritton Jonsson traces the history of this cornucopian promise, identifying two hypotheses:

> (1) Cornucopian ideology emerged in tandem with fears of physical limits to growth. Since the late Enlightenment at least, these two forces have been feeding on each other, generating rival forecasts of technological development. (2) The long duel between these competing ideologies must in turn be situated within an environmental history of economic growth.[57]

The dualism of abundance and depletion informed 19th-century economic principles which posited that when fertile lands were completely exploited, agricultural production could simply migrate to other zones whose soil could be enhanced with capital and labor. This logic largely

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[56] Kudo consistently refers to these sculptures as hothouses, rather than greenhouses. The primary difference between these types of structures is the type of heat source: hothouses contain internal heating systems, while greenhouses utilize heat from the sun.

[57] Fredrik Albritton Jonsson, "The Origins of Cornucopianism: A Preliminary Genealogy," *Critical Historical Studies 1,* no. 1 (Spring 2014): 153.

fueled the colonial 'landscaping' of the New World that engendered the imperial picturesque developed by Casid.[58] Cornucopian spaces as sites of resource extraction were moveable, malleable, and suitable for indefinite substitution and improvement. In a similar vein, the microenvironment of *Eyeball Farm* connotes a frontier for sensory and technological harvest, migrating across arts spaces, exhibition catalogues, and laptop screens. But only in person can a key element of the sculpture's infrastructure be fully realized. Kudo has mounted a circular mirror to the interior of the hot house, angled to reflect our faces as we peer inside. The fruits of the hot house are consumed through looking, via the transmission of the invisible matter of light waves and electronic currents. Forced into reciprocity, *Eyeball Farm* places us into its network of optically-driven growth.

In addition to cultivating colonial landscapes primed for plantation economies, imperial botany also granted wealthy and powerful Europeans access to tropical plant species, largely contributing to the rise of artificial flowers as tokens of intellectualism and class. But actually importing and caring for live plants was a considerable commitment, requiring more sunlight, heat, and humidity than European climates could provide, and by the turn of the nineteenth century, glass and iron hothouses warmed by hot water pipelines became frequent fixtures of Victorian mansions.[59] For keeping exotic plants at a smaller scale, middle to upper class homes displayed ornamental Wardian cases, airtight micro-ecosystems made of glass and wood developed by amateur naturalist Nathaniel Bagshaw Ward in 1829.[60] *Eyeball Farm* looks like iterations of these Wardian cases. They were mechanisms of contained botanical cultivation treated as a household product, interior decor, and status symbol. Traveling Wardian cases, on the

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[58] Casid, *Sowing Empire*.
[59] Giovanni Aloi, "The Greenhouse Effects," in *Why Look at Plants?: The Botanical Emergence in Contemporary Art*, ed. Giovanni Aloi (Leiden: Brill Rodopi, 2019): 139.
[60] Luke Keough, *The Wardian Case: How a Simple Box Moved Plants and Changed the World* (Chicago, Richmond, Surrey, UK: The University of Chicago Press; Royal Botanic Gardens, Kew, 2020), 1.

other hand, were much sturdier due to their strong wooden frames in order to better facilitate the global spread of imperialism. Both types of cases depend upon observation, wherein the livelihood of the plants inside can only be confirmed through looking.

Luke Keogh's 2020 study *The Wardian Case* examines the history of traveling cases, which enabled the transport of cash crops to and from the colonies at much larger scales and with greater success than previous types of plant boxes. Wardian cases were involved in the horticultural networks which included colonial botanists who classified native plants and assessed opportunities for profit, along with botanists at the metropoles who studied the viability of imported plants in foreign geographies. Wardian cases signalled a major development in processes of botanical globalization, introducing a locus of cornucopian fantasies and hybrid landscapes contained within fragile glass boxes.

Like Wardian cases, Kudo's sculptures are packaged, portable, and refer to familiar household goods. Imagine a bucket swinging in time with a worker's footsteps, a birdcage disrupting the light from a bay window, a potted plant resting upon a desk. Or a plexiglass microhabitat of modest design. *For Your Living Room*, Kudo names one. Another, *Souvenir*. These works hover between domesticity and mobility, and Kudo's various terrarium-like structures reference both ornamental and traveling Wardian cases, sometimes elevated on legs like the former or more compact with sloping sides like the latter. And as art objects with lengthy exhibition histories, they function in both ornamental and mobile capacities.

The appeal of ornamental Wardian cases and greenhouses attached to the home was primarily superficial. They domesticized exotic, faraway lands for observational enjoyment. Green and blooming all year round, these fabricated habitats managed temperature, humidity, and time to lock plants into an unnatural Edenic state. These paradisiacal enclosures, however,

contain the same sort of absurd artifice suggested by Kudo's hothouses, aquariums, and dioramas. Like plastic foliage, greenhoused plants too are fixed into artificial states of verdancy. Plants forced to thrive in foreign environments are husbanded through artifice. Lush green paradises on display in glass cases against a snowy English winter or inside a dark study flaunt their fakeness and point to the anatopic amalgamation of foreign plants and conflicting climates, in addition to anachronistic cycles of life. These spaces function not as a simple substitute for a botanical paradise. Instead, an alternate nature emerges, in which only one season exists – the flowering season.

Beneath the flashy suggestion of mutant greenery lurks a vested engagement with the frivolity of readymade decor. *Eyeball Farm*, as an art object, partly serves an ornamental function, thereby inviting itself inside. This inversion of interior and exterior can be found not solely in the function of these objects, but inscribed directly into their form. Ina Blom's 2008 book *On The Style Site: Art, Sociality, and Media Culture* proposes the titular concept of the 'style site' as the convergence of form and format. Style, she argues, cannot solely be understood as an object's attribute. Rather, style is the location where meaning and relations take place. Because style is associated with appearance, and appearance incites recognition and identification, style and social identity together compose an interaction that should be considered a 'site'.[61] The style site therefore "rethink[s] contemporary sociality based on the historically new position assigned to style and design issues, and to the general aesthetic phenomena present in everyday culture."[62] Here, Kudo's various suggestions of domestic space amidst the broader arcs of environmental manipulation and techno-organic hybridity contain the forces that construct a style site.

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[61] Ina Blom. *On the Style Site: Art, Sociality, and Media Culture* (Berlin: Sternberg Press, 2007), 16.
[62] Blom, *On the Style Site*, 23.

Eyeball Farm incorporates the viewer into its agricultural experiment through the use of the mirror, as well as by suggesting that the energy of light acts as an equalizer between human perception and growth. The social implications of the artwork, that is, the suggestion that vision and technology are mutually cultivated within an enclosed environment, are inscribed directly into its form, wherein the vibrant green color of the case adds an atmosphere of endangering yet alluring radioactive futurity. The vaguely familiar format of the elevated case appears at home in a museum and coupled with the contents inside, what readily appears are avenues of analysis that may refer to the implications of unsustainable gardening practices and technological fusions with nature. Wasting resources to force plants to flourish against their natural rhythms and espousing the moral wrongness of fakes and following the march against all 'technology' – the popular discourses around these concerns often dethrone form and appearance. The site of the contemporary art gallery is suffused with politics, promoting an air of intellectualism that can prescribe and foreclose interpretive possibilities for the works inside. Understanding artworks like *Eyeball Farm* as a style site works to recuperate the significance of the work's appearance in these suggestions of social and environmental phenomena that occupy its spatial locale.

The truth is, as evidenced by Victorian-era technologies to bring exotic plants home as well as the contemporary popularity of houseplants as air-purifying objects that 'add life' to dull urban environments, we readily nurture artificial plants. We want artificial plants, whether made of plastic or living organisms working against their natural systems, because they look nice. Greenery looks good. But artificial plants are an imperfect, even tacky surrogate, and house plants grown in isolation have more in common with pets than lush landscapes. They are crowded into containers, blasted with heat and humidity, and grown under watchful eyes. Likewise, the artificial environment of *Eyeball Farm* exists under tight control – there is even a

small gauge affixed on one wall to monitor temperature. Its toxicity is located directly within the structure, interacting with the unappealing appearance of loose eyeballs and radioactive coloring. Likewise, the museum or gallery space follows rigid parameters for temperature, humidity, and lighting to extend the lives of the artworks inside. In these spaces, visitors also find themselves regulated not only through environmental means, but also through the collective social surveillance that reduces voices to whispers and makes movements feel simultaneously clumsy and careful. Museumgoers too are subject to environmental and bodily regulation. The art object, like the landscape inside, is read and understood by looking under specific conditions that affect the body, collapsing ornament, observation, and critique into a single biopolitical function.

Kudo's visual style which brings forth associations with the sociality of plant cultivation hinges upon a kitschiness that makes the artist's hand immediately evident. The crudely sculpted eyes in *Eyeball Farm* and childlike attitude inscribe a dissonance between the technical imperfections of his craft and the technological mastery of industrial agriculture. Observe works like *Cultivation of Nature—People Who Are Looking At It*, (1970) (Figure 19), a bucket full of snails and blue eyes, or *Souvenir "La Mue," For Nostalgic Purpose, For Your Living Room* (1968-1969) (Figure 20), an electric blue birdcage packed with singing noses. Eyeballs and other sense organs take on a cartoonish appearance. Nosehairs escape their caves, calcified penises shrivel up before full bloom, and snotty goo glistens disgustingly. But Kudo's disregard for realism enacts a supernatural vision of fantasy. His approach to the grotesque is 'improper' and imaginative, his severed sense organs notably lacking the abject appearance seen in, for the sake of morphological comparison, Louise Bourgeois' dingy bronze organs or Yayoi Kusama's sickly white penises. Kudo's playful style also distinguishes his work from others concerned with ecological concerns. Unlike American eco-art pioneers Helen Mayer Harrison and Newton

Harrison, who approach human sustainability through an utopian lens with alternative farming practices arranged like color-field paintings, or more contemporary musings on the dystopian possibility of the ‘end of the world’, Kudo’s attitude appears less severe. The vibrant colors and frequent use of blacklight to illuminate the works only add to their absurdity.

The ridiculous, transmogrifying tone of Kudo's artworks play an integral role in destabilizing the opposition between natural and artificial and between endorsement and criticism of new hybrid ecologies. In someone’s private collection, a sculpture like *Souvenir*, the putrid yellow potted plant, might fit in seamlessly as decor, a quirky conversation piece displayed in domestic daylight. The work welcomes the dreaded descriptor of ‘decorative’. *Souvenir* may gesture to potted plants that ‘live’ to a fuller capacity when compared to plants trapped inside glass cases. But despite its open-air existence, the potted plant continues to appeal to the aesthetic senses, exaggerated here through Kudo’s application of attention-grabbing fluorescent color. In a gallery setting, where *Souvenir* is more likely to be displayed under blacklight and shift in appearance, the kitschiness might be distasteful to some or a clever play on low culture to others. However, its mere placement in an art institution implies a baseline of aesthetic approval, and any accompanying wall text inevitably lays claim to the intellectual concerns that resound within. Attention to appearance becomes secondary. By treading between commonplace ornament and flashy art objects, Kudo’s sculptures highlight the visual losses accrued in these various sites of looking. In one place of exhibition, such as the home, the artworks operate as decoration or as pure form but in the absence of blacklight cannot flux and respond to changes in light to its fullest capacity. In another, such as the blacklit gallery space, the works’ expanded form is eclipsed by concept or theory.

Collapsing disparate environments, organisms, and objects into a single site demonstrates how hybridity necessarily contains absences or elisions. Components cleaved from their sources, crammed inside tanks or cases, and arranged into a single row may signal towards a notion of new ecology that espouses intermixing and the possibility of mutual growth, but the visual effect is one of absurd dissonance. The appearance and social identity of objects like *Grafted Garden, Eyeball Farm,* or *Souvenir* suggest living systems, but they are constantly subject to environmental maintenance. Style constitutes the deeply conditional site of these objects, presenting the illusion of total understanding through circumambulatory arrangements. Kudo's microenvironments and the gallery space at the Stedelijk Museum sort impossible mixtures, and this spatial ordering, which neatly catalogues difference, operates through a form of legibility that has been legitimized through juxtapositional accumulation. Kudo delivers a new ecology assembled in the terms of natural history, a fiction made hypervisible through discursive means.

Part Three: Circuits

Eyeball Farm or another from the series, *Cultivation by Radioactivity in the Electronic Circuit* (1969) (Figure 21) (hereafter referred to as *Brain Case*) contains an integral element not explored thus far. Where the plexiglas panels come to a point, Kudo affixes a blacklight tube which both exaggerates the fluorescent effect and speeds the process of photosynthesis. Greens glow brighter under ultraviolet light. This hypervisibility blurs the seemingly oppositional functions of cultivation and radioactivity, but while *Eyeball Farm* illuminates both as processes that organize our visual and agricultural fields through amplification, *Brain Case* gestures towards an alternate mode of machinated coexistence. Here, the concern is not necessarily with agrarian influences on colonial ordering, but rather on a more contemporary engagement with information technologies.

Kudo's combined use of blacklight, electronic transistors, and vacuum tubes gestures towards the development of the semiconductor industry. The 1950s through 1970s were a pivotal period for electronic technologies, in which widespread use of vacuum tubes was phased out by the invention of transistors, which in turn triggered the emergence of integrated circuits. In the first half of the twentieth century, vacuum tubes were the most important type of electronic amplifier, enabling widespread use of radio. Vacuum tubes were bulky and energy-consuming, but they effectively amplified electrical signals and were relatively easy to manufacture. This seemed like a fair tradeoff to the burgeoning semiconductor industry, and vacuum tubes were eventually applied in long-distance telecommunication, television broadcasting, and medical devices.[63] Vacuum tubes were also used for sophisticated radar technologies, largely contributing to the abject annihilation caused by the Second World War. Silicon and germanium were singled out as two of the most promising materials to further facilitate military activities. These two elements became primary objects of research in American government, university, and industrial laboratories.[64]

In 1947, American industrial research organization Bell Industries invented the transistor, a small device that could amplify or switch electrical signals.[65] Initially seen as a smaller, scalable alternative to the larger and more inconvenient vacuum tube, transistors were widely marketed and publicized, even though their viability was still under question at the level of research and development. Researchers experimented with transistors made of silicon and germanium, as the properties of both elements were already well known. Silicon is the second most abundant element on earth, and its resilience against high temperatures made the material

[63] Ernest Braun and Stuart Macdonald, *Revolution in Miniature: The History and Impact of Semiconductor Electronics Re-Explored in an Updated and Revised Second Edition*, 2nd ed. (Cambridge [Cambridgeshire]: Cambridge University Press, 1982), 13.
[64] Dirk Hanson, *The New Alchemists : Silicon Valley and the Microelectronics Revolution*, 1st ed., (Boston: Little, Brown, 1982), 75.
[65] Braun and MacDonald, *Revolution in Miniature*, 33.

an ideal choice for military applications (i.e. rockets and missiles).[66] Despite these advantages, silicon was difficult to purify and transistors made of the element did not perform as well as germanium transistors. Germanium is rare compared to silicon, but at the time, it was readily available as a byproduct of US zinc refineries. But the more lucrative source was British coal. Coal burned in Britain created dust containing germanium in high concentrations. Chemical processes that extracted germanium from the coal byproduct fueled the development of germanium transistors in the US, where almost all semiconductor research took place in the mid-twentieth century.[67] By 1955, nearly all transistors were made of germanium.[68]

Again, we see the dark waste of the coal industry serve as a source of technological innovation. But unlike the colorful proliferation of synthetic dyes that followed the chemist Runge's blue discovery, the development of transistors was slow and difficult, with industry professionals describing the process as an "art rather than science, as witchcraft, black magic."[69] By no means could vacuum tubes be simply swapped with transistors, as they relied on fundamentally different technologies. Though germanium was a familiar industry material, transistors themselves were entirely foreign to experienced semiconductor developers, and their small scale and sensitivity meant manufacturing resulted in extremely low yields. One researcher at Bell Industries claimed, "It was like trying to do surgery on the head of a pin."[70]

The key breakthrough was the development of the planar technique, which appropriated photographic technologies. Planar transistors were made via a multi-step process of oxidation, photographic etching, and diffusion of impurities to enhance conductivity (known as germanium or silicon 'doping'). These are the transistors that crop up across Kudo's sculptures. They look

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[66] Hanson, *The New Alchemists,* 82.
[67] Braun and MacDonald, *Revolution in Miniature*, 58.
[68] Braun and MacDonald, *Revolution in Miniature*, 58.
[69] Braun and MacDonald, *Revolution in Miniature*, 66.
[70] Hanson, *The New Alchemists*, 83.

like small-brimmed metal top hats balancing on sets of delicate, wiry legs. The planar technique worked best with silicon, resulting in an overall decline in the use of germanium, but the application of the photolithographic technique was instrumental in eliminating issues related to scale and precision. Despite the success of building individual silicon transistors through light-based etching, however, hand-wiring them into circuit boards was "horribly inefficient."[71] The difficulty in increasing the viability of transistor technologies reflects what Gilbert Simondon describes as a function of circular causality, in which the invention of technical objects are only viable if they build out a place for themselves within an associated milieu; this describes "the condition of existence for the invented technical object."[72] He writes in his book *On The Mode of Existence of Technical Objects*:

> the elements that will materially constitute the technical object and which are separate from each other, without an associated milieu prior to the constitution of the technical object, must be organized in relation to each other according to the circular causality that will exist once the object will have been constituted; thus what is at stake here is a conditioning of the present by the future, by that which is not yet.[73]

The problem with actualizing the transistor, therefore, was not its baseline utility, but that it lacked the proper milieu in which it could operate. When Kudo was making sculptures that included transistors in the late 1960s and early 1970s, transistors were applied in various devices like transistor radios and hearing aids, but these machines were imperfect and costly. They were still understood as discrete elements that could potentially render vacuum tubes obsolete through replacement. Therefore, the presence of transistors in Kudo's artificial landscapes and plastic tubs suggests their placement in inadequate milieus. The forcibly hybridized and naturally

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[71] Hanson, *The New Alchemists,* 94.
[72] Gilbert Simondon, *On the Mode of Existence of Technical Objects*, trans. by Cécile Malaspina and John Rogove, First edition (Minneapolis, MN: Univocal Publishing, 2017), 59.
[73] Simondon, *On The Mode of Technical Objects*, 60.

artificial environments suggest an impulsive meshing of unrelated elements that foresees a future arrangement that does not yet exist.

The invention of technical systems, which may also describe Kudo's new ecological habitats, depends not on forms, but the ground that carries them. A passage from Simondon's book explains this relation:

> For the ground is the system of virtualities, of potentials, forces that carve out their path, whereas forms are the system of actuality… Forms are passive in so far as they represent actuality; they become active when they organize in relation to this ground, thereby bringing prior virtualities into actuality… The milieu plays the role of information; it is the seat of self-regulations, the vehicle of information or of energy that is already governed by information.[74]

What Simondon describes here is similar to Blom's style site, in which style or form bears meaning because it is rendered through its site or ground. The transistors in Kudo's sculptures then, are as out of place as the plastic plants and body parts are, captured and organized inside containers. The social identity of these different components as references to the monoliths of technology, nature, and mankind coheres precisely because of the system they occupy.

In a different Wardian case of sorts, *Brain Case*, electrical diagrams mark the inside surface, obscured by a thick layer of translucent goo. Squelched into place, pink brains and transistors glisten beside the blacklight tube installed inside the case. A small swarm of flies cling to the light (Figure 21). Their spindly legs and bulbous bodies echo the form of the wiry transistors, imbuing the environment with an otherworldly rectilinear harmony. Unlike the scene of agricultural harmony suggested in *Eyeball Farm*, this sculpture reflects danger and decay. The pesky flies and the strange layer of goo evoke a sense of revulsion, while the loose brains are confronting and uncanny. Because these things are sealed inside plexiglas walls, the sculpture

[74] Simondon, *On The Mode of Technical Objects*, 61.

manages to invite closer looking which reveals black markings embedded in the brain that resemble circuit diagrams.

The naturalization of artifice takes place again here, where the upright transistors correspond to the brains mapped like circuits. In this case, the various components appear organized in relation to each other, evoking a cyborgian circuit board rather than a collection of unrelated objects declared a 'new ecology' post facto. Slime coats the entire interior, as though each component sweats out the same type of goo. The blacklight tube adds to this harmonizing effect, bathing the elements in a unifying ultraviolet glow. The scene of hybridization offered in this sculpture feels more convincing than the smorgasbord of creatures stuffed inside plastic tanks. While the majority of the enclosures in the Stedelijk Museum's *Your Hothouse, Your Aquarium, Your Cage* reflects the accumulation of specimens and organization into legible arrays, that legibility advanced by natural history dissolves with *Brain Case*. Instead, the objects are placed into an environment that equalizes, offering a closer picture of 'mutual growth' espoused in Kudo's manifesto and throughout studies of his oeuvre. This environment appears to have materialized spontaneously, or at least as a direct result of the interaction between the stuff inside. In other words, it seems like the brains, transistors, flies, and goo have emerged in concord with the circular causality that their very emergence has created.

The greater visual evidence of co-constitutive environmental formation presented by *Brain Case* may be read in tandem with the contemporaneous advancement in semiconductor technologies. Once the planar technique introduced photolithographic processes, developers sought ways to skirt the inefficiencies associated with the meticulous hand-wiring of tiny discrete parts. The solution was to paradoxically make transistors even smaller, so they could be arranged onto a single piece of silicon known as a wafer. Silicon wafers could be imprinted in their

entirety and therefore eliminate manual assembly. Stan Augarten compares the difference as like a chess board; rather than gluing separate dark and light squares together to form a grid, a board could simply be printed with the checkerboard pattern.[75] This imprinted board is called an integrated circuit, which is made by first heating and steaming silicon wafers in ovens reaching up to 2,000 degrees Fahrenheit to create a layer of electrically insulating rust. Then, the wafer is coated in photoresist, an emulsion that reacts to ultraviolet light, and then developed in an acid solution, resulting in an imperceptibly three-dimensional surface.[76] Finally, the surface is doped. This process is repeated many times, resulting in a finished wafer that contains as many as five hundred circuits. Each circuit, in turn, contains thousands of tiny transistors.[77]

Moore's Law, posited by Gordon Moore in 1965, projects that the number of transistors will double each year, while the size of the chips they constitute will remain largely unchanged. Moore's Law predicted the incredible expansion of semiconductor technologies, but it also showcases an important difference in how information can be configured. The miniaturization of circuitry and the condensation of discrete parts into a single etched form reflects an inverted mode of organization compared to the accumulative natural history model. While hothouses, tanks, and terraria store information to create an accumulative body of knowledge, circuitry follows a model of storage that expands inwards. The site of information implodes and becomes increasingly illegible. The arrangement of objects along a gallery wall territorializes space, akin to cornucopianism's premise that depleted lands could be resolved through relocation. Circuitry, on the other hand, requires a circular causality, in which the board or ground serves as a vehicle for an ever-increasing number of forms that only function because they exist in the system they

[75] Stan Augarten, *State of the Art : A Photographic History of the Integrated Circuit* (New Haven: Ticknor & Fields, 1983).
[76] Augarten, *State of the Art*
[77] Hanson, *The New Alchemists,* 135.

compose. Where one model requires expansion to increase legibility, the other caves inwards and obscures.

Kudo's habitats indicate how the enclosure of foreign objects fails to cohere in a comprehensive manner, revealing the inadequacies of shelving objects into a static and orderly system. *Brain Case* places brains into a goopy electronic circuit whose sum is greater than its parts, and though the transistors, brains, diagrams, and slime appear locked in symbiosis, the sculpture still functions as a critique rather than an advocate for fusion. The implosive, shrinking expansion of storage enabled by the integrated circuit eliminates language and uses binary instead. Information is obscured and illegible in the format given by electronics in contrast to the encyclopedic collection of objects tethered to language suggested in *Your Hothouse, Your Aquarium, Your Cage*.

Because the photolithographic technique for carving out the ground that carries electrical current is made possible through the application of invisible ultraviolet light, integrated circuits remove visual perception from both the form and the process by which information is stored. Digital technologies, or hybrid circuits like *Brain Case*, therefore make information legible largely through visually inaccessible methods, thereby displacing the act of looking to a second order that is mediated by invisible forms, rather than through the hypervisibility caused by the lateral arrangement of discrete objects. Delivered by the sculpture's blacklight tube, ultraviolet light, literally makes information coalesce and shine. Ultraviolet light is invisible to the human eye because of its shorter wavelength. The compressed form of ultraviolet light itself engenders the condensation of information into avisual terms that is revealed through Kudo's irradiated sculptural forms.

Conclusion

Kudo's artworks embrace excesses in myriad terms: stretched and melted artificial flowers, expanded configurations of global organisms, and the encompassing allure of blacklight illumination. These excesses erupt from openings which complicate notions of techno-organicity or ecological hybridity to propose that sites of discontinuity can prove fruitful without seeking closure. Artifice, as a non-real and non-productive status that refuses recuperation, materializes as an ontological condition in its own right, a condition that is at home in darkness itself. To shine a light upon that darkness is to introduce an annihilating exposure that negates the abundance inherent to invisibility. It presents a mutation disguised as a revelation. Kudo's mutant ecology likewise traps and relocates our attention to an alternate space that is readily understood yet disconnected from its origins. However, his tenebrous atmospheres amplify invisibilities, diffusing latencies with fluorescent color that provide access, rather than translation.

Synthetic color, plasticky materials, and electronic components inhere as a medium for reading Kudo's sculptures, constituting their physical being and interpretive potential. His new ecology's originary artifice undergoes material manipulations and spatial configurations that do not unveil something obscured. Obscuration suggests a grand reveal, but nothing truly hides in Kudo's world. Rather, Kudo brings us into a fantastic and phantasmatic realm drenched in fluorescent color and embraced by ultraviolet light. Invisible suggestions live amongst visible representations, and under the emanant glow of compressed light stretched to our visual field, there appears a threshold where unknowability is shared in spectral form. This is a co-constitutive encounter. Perception meets invisible matter, and through fluorescent exposure, surroundings and self coalesce. Fluorescence grants access to a plenum in which we have always already dwelled.

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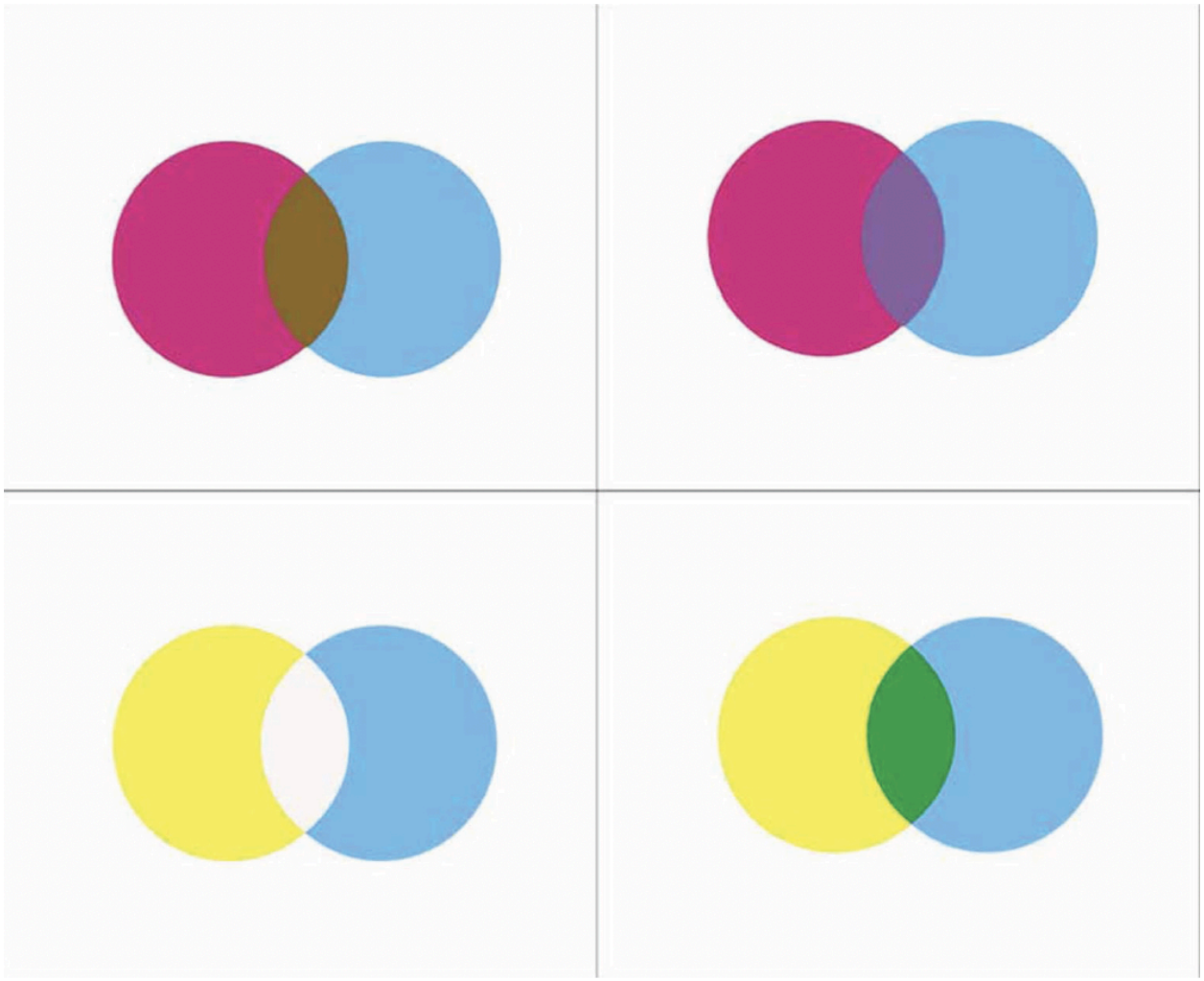

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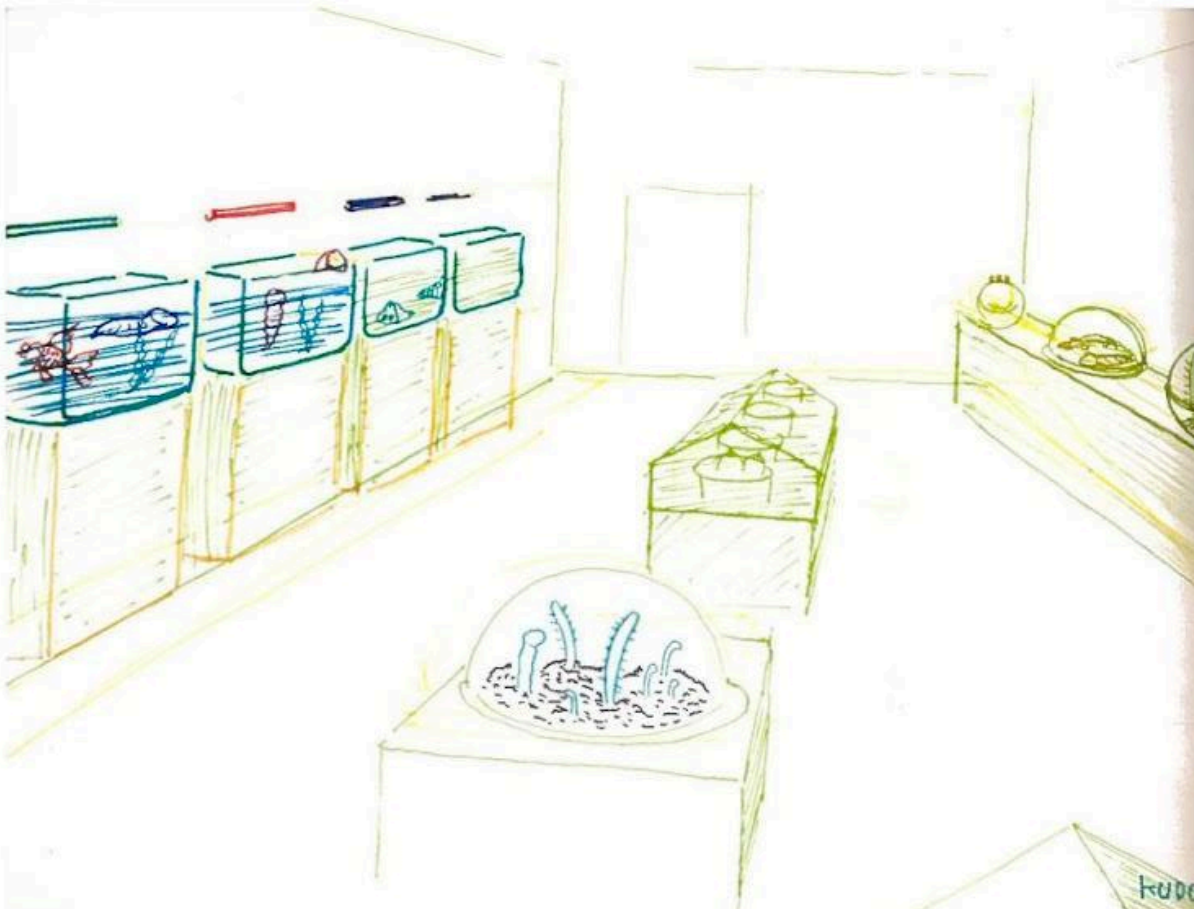

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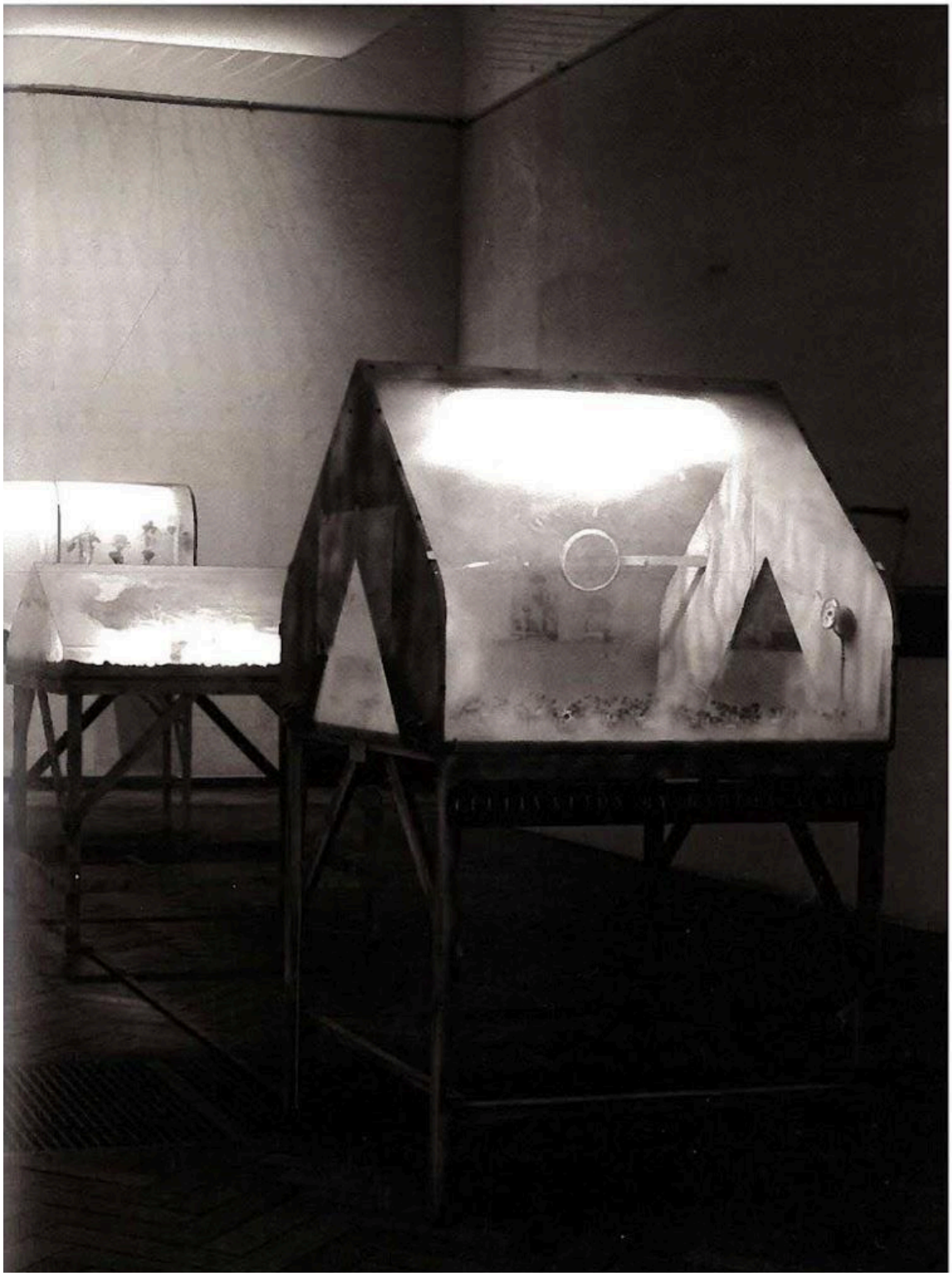

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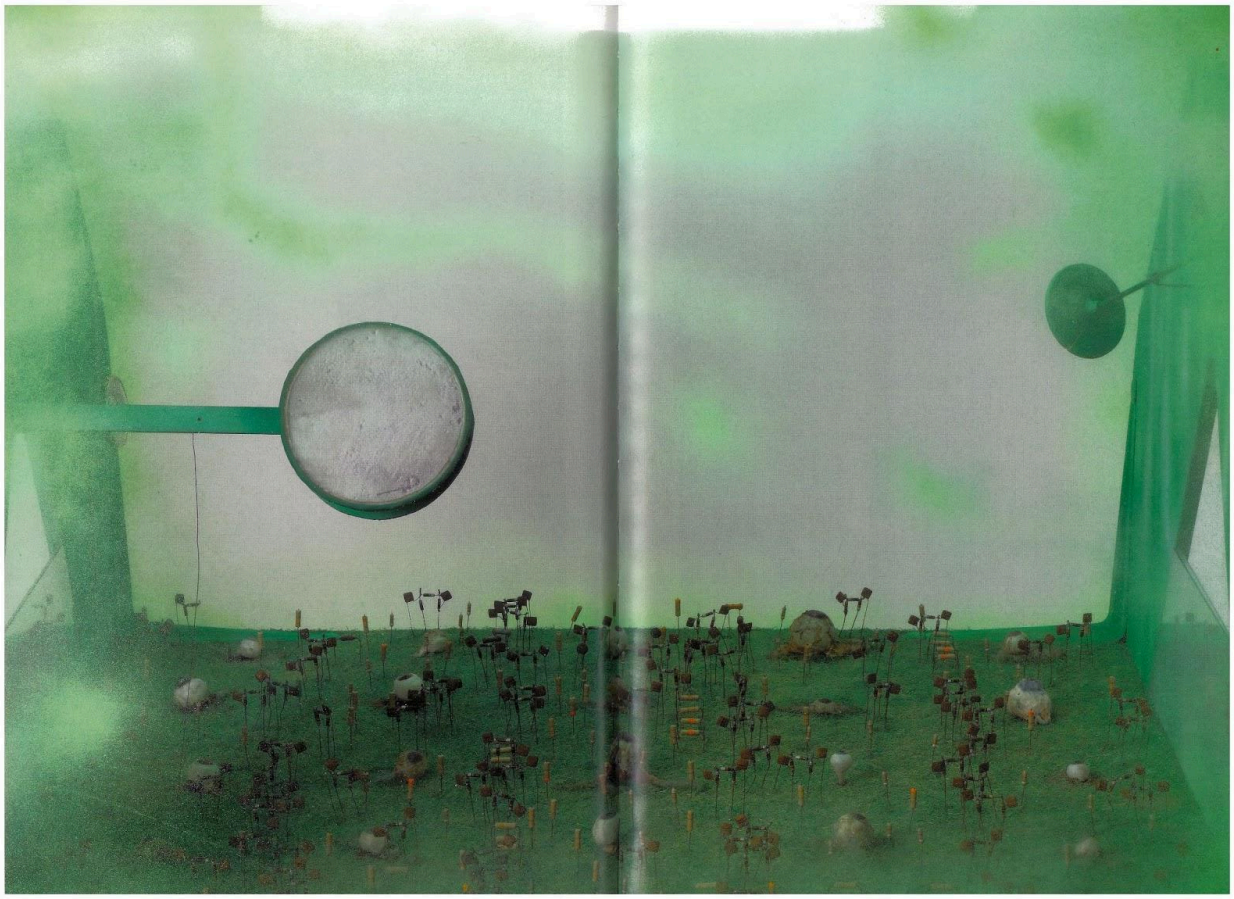

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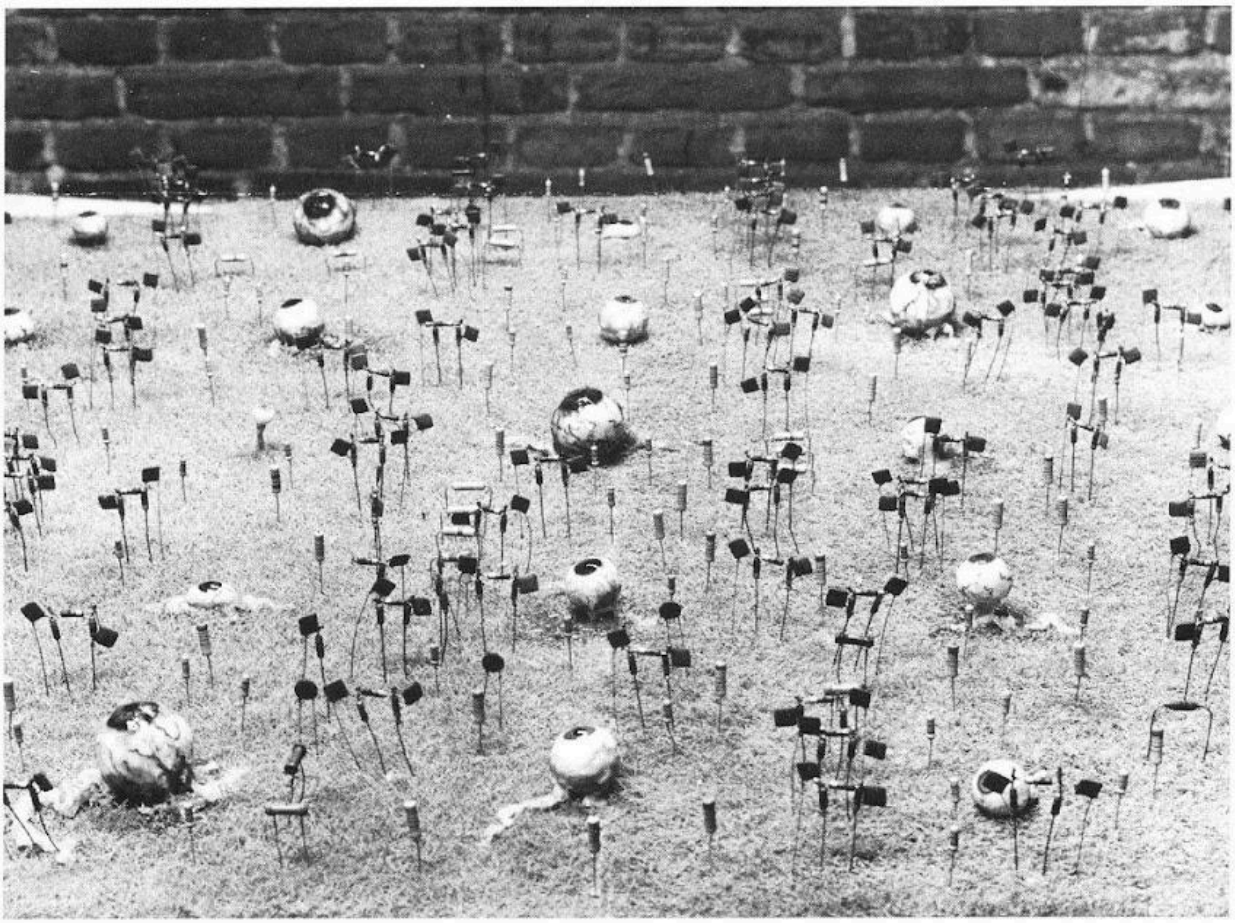

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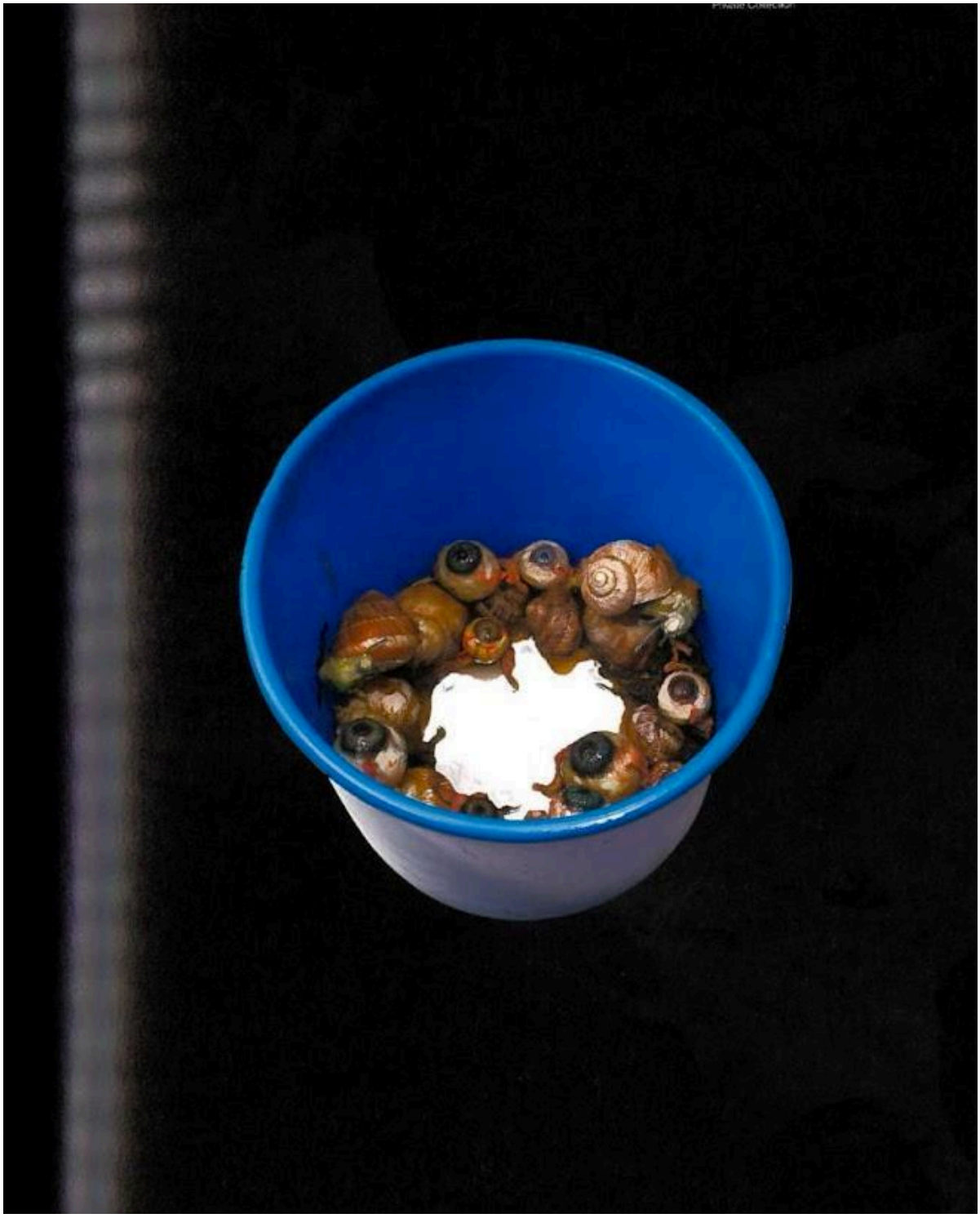

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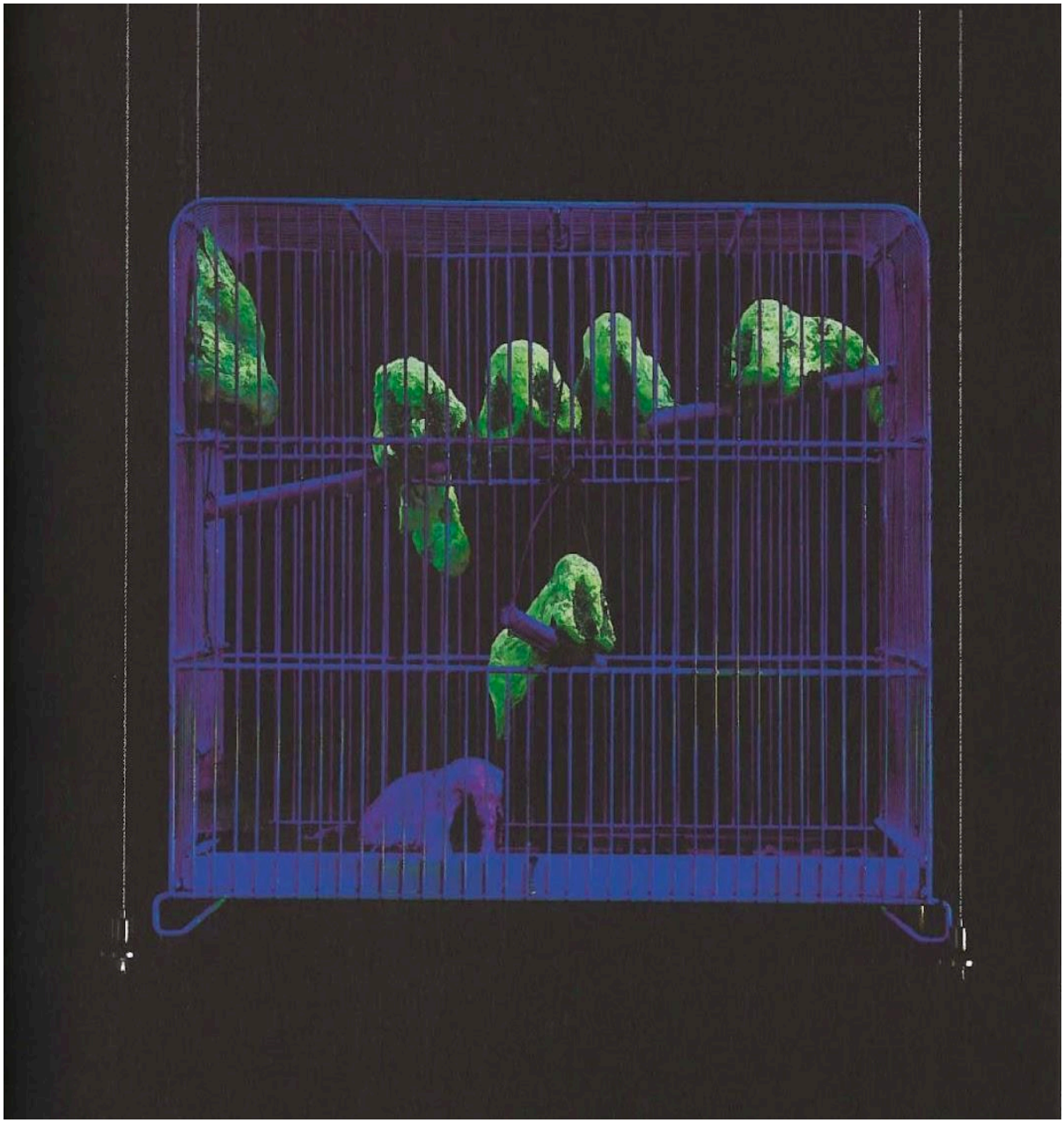

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