The Valley of Heart's Delight:
Tinkle Toy

by Greg Borenstein

In his book, *What The Doormouse Said: How the 60s Counter-Culture Shaped the Personal Computer Industry*, John Markoff tells an anecdote that vividly summarizes the eccentric combination of cultural forces that were present at the inception of the contemporary technological era. He describes personal computer pioneer Doug Engelbart taking his staff of SRI engineers to the International Foundation for Advanced Study for an experiment in the use of LSD to enhance engineering creativity and problem solving:

> *"The premise underlying the experiments was to motivate a group of people who had spent at least three months working on a difficult technical or creative issue and were not making progress. The problems were supposed to be ones the scientists had a high emotional need to solve. After lunch, and after the LSD had taken effect, they would be put to work, while the researchers observed.*
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> *"In the group setting, everyone was making progress. Electrical engineers were designing circuits; Hewlett-Packard mechanical designers were improving their lighting designs; architects were designing buildings. But not Doug Engelbart. His reaction to his first trip was to become virtually catatonic. He simply stared at the wall for the duration of the experiment.*
>
> *[...]*
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> *"Engelbart's contribution to the creativity session was a toy he conceived under the influence of LSD. He called it a "tinkle toy", and it was a little waterwheel that would float in a toilet bowl and spin when water (or urine) was run over it. It would serve as a potty-training teaching aid for a little boy, offering him an incentive to pee in the toilet."*[1]

Surreal and funny though this episode may be, it also encapsulates the foundational moment and meaning of the personal computer. This world-changing platform arose not simply out of raw technological advancement, but out of the intersection of this technology with the goals of the counter-culture: personal creative

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[1] John Markoff, *What The Doormouse Said: How the 60s Counter-Culture Shaped the Personal Computer Industry*, Penguin 2006. p.67

fulfillment and augmentation through any means available be it technological or chemical. The same people who invented the foundations of modern computer technology were simultaneously active participants in counter-cultural experiments with psychedelic drugs, alternative forms of community, and radically informal modes of social comportment. In fact, they viewed these experiments as of a piece with their technological explorations, as simply different ways of advancing their core mission of augmenting human capacity and frequently intermingled the two.

Fifty years later, we live in a world profoundly shaped by the results of this intermingling. Many of the technologies that we use every day, from word processors to online social networks to smart phones, arose from this alliance between the techno-culture and the counter-culture and embody its characteristics and traditions. However this history has gone little acknowledged or memorialized.

For my thesis, I set out to concoct an artistic process that can do justice to this history. Just as artists of the past made monumental sculptures and history paintings to tell the foundational stories of their culture, I set out to find a medium that could do the same for the origins of the personal computer.

However, because of the nature of this history, I judged no impersonal, cold, or traditional artistic medium appropriate. What I sought was a medium that would match the eccentricity and hybridity of the social and intellectual movement that Markoff describes in *What The Doormouse Said.* To be faithful to this material, my monument would by needs be an absurd and personal one.

Further, I set out to construct this monument using the digital tools that began their evolution with the advent of the personal computer. As a core component of their

mission, the early personal computing pioneers created powerful tools that allowed individuals to manipulate text and images, audio and video. Our sophisticated contemporary multimedia creation tools (for photo manipulation, video editing, 3D modeling, etc.) are the decedents of their efforts. Hence I judged that the appropriate aesthetic vocabulary for my monument is that of cinematic special effects.

Special effects represent the cutting edge of the image manipulation and creation approach initialized by the personal computer revolution. While they were, until recently, the sole purview of multi-million dollar blockbuster movies, the continuous improvement of personal technology initiated in the 60s is rapidly bringing them within the reach of individuals. With the growing ubiquity of 3D animation, compositing, digital fabrication, and motion capture tools, it has suddenly become possible to put these tools to use, not just creating gigantic impersonal commercial productions, but in building exactly the eccentric monument the personal computer revolution deserves.

The rest of this thesis will explore what an artistic practice modeled on special effects might look like and attempt to carve out a theoretical framework for what such a practice might mean.

Special Effects as Artistic Practice

> *"What is a special effect? A technological marvel controls an illusionistic environment. It has ben set up to deliver elaborate shocks. Within these shocks, an allegory emerges. Staged as an epic journey, this script immerses the viewer in a reassuring adventure. This adventure is often about a 'marvelous' power larger than life, larger than humans can ever hope to be."*
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> —Normal Klein, *The Vatican to Vegas*

Norman Klein identifies three defining components of the special effect: it creates an "illusionistic environment"; it delivers "elaborate shocks"; and "an allegory emerges".

This is the formula for an artistic practice: combine disparate images into a single pictorial whole, present the composite image in a way that flaunts its lack of seams, and use the resulting image to tell a story.

The central goal of creating the source footage for special effects is to capture elements that are isolated enough from their surroundings to be easily recombinable. These sources can range from footage of actors in front of green screens to portions of a miniature set photographed to appear at scale, to impossible imagery such as fantastic creatures and environments created wholly digitally.

This footage is captured for the express purpose of being composited — combined into cohesive environments without any trailing indicator of its source to differentiate it or break the illusion. Compositing collapses the multifarious materials, media, and scales of the disparate physical and digital components of the source footage into a single unified visual image.

Once that visual image is formed, the last step is to display it in a format that flaunts its seamlessness. In movies, this is typically accomplished by projecting it onto huge screens or distributing it in high resolution digital formats. This delivers an "elaborate shock", i.e. an image that is visually convincing in spite of the viewer's definite knowledge that it cannot be real.

And finally, this seamless image tells the viewer a story. It depicts a scene with characters engaged in a narrative. For Klein, that narrative has very particular properties: it is epic and immersive; it tells of a larger than life adventure. In sum, it is mythic.

I explored this formula by producing a narrative image through a radically hybrid process of image capture and creation that uses every tool of special effects image-making currently available, from miniature photography to motion capture and computer animation. Specifically, I produced a series of physical assemblages that I capture through video cameras, I animated digital characters via live motion capture performance, and I photographed conventional normal-scale objects and elements.

In order to dramatize the process of compositing – and to administer the "elaborate shocks" Klein calls for – I constructed a system that captures and combines these objects and elements into the final image in real time directly in front of the viewer. The finished piece consists of the final "live" image, the physical and digital objects that make it up, and, importantly, the network of connections that is formed between these by the process of compositing.

This approach resonates strongly with the interpretive strategy Ian Bogost calls "unit operations":

> *"Unit operations are modes of meaning-making that privilege discrete, disconnected actions over deterministic, progressive systems....Any medium can be read as a a configurative system, an arrangement of discrete, interlocking units of expressive meaning."*[2]

Compositing establishes an arrangement of the individual "discrete" image elements into a unit of "expressive meaning" in the form of a single shot. Further, these elements constitute a network or "configurative system". From shot-to-shot and scene-to-scene within a film, the individual elements are constantly recombined in different contexts

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[2] Ian Bogost, *Unit Operations: An Approach to Videogame Criticism* MIT Press, 2008

and combinations to produce the series of elaborate shocks that make up the larger story.

Bogost's account of these units, however, emphasizes their "discrete" individual identities with their own "expressive meanings" rather than their disappearance into the cohesive surface of the final product. And my physical, "live compositing", approach attempts to maintain this tension between the "expressive meaning" of the units themselves and their role in the "progressive system" of the final image. As standalone objects they will have a powerful physical presence and a richly poetic sense of the mystery of a fragment.

The Story

> "*Special effects as staged chaos warn about apocalyptic risks to come, while at the same time making these threats easy on the eye. It prepares us and disarms us. It gives the illusion that we have control over our entertainment, while it encourages us to give up control, settle back and take it. It suggests power dressed up as innocent fun.*"
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> —Normal Klein, *The Vatican to Vegas*

While Bogost's account of "unit operations" provides an interesting lens for looking at compositing as an artistic medium, by necessity, it helps little in thinking about the actual story being told by this "illusionistic environment". So, what of the emerging allegory that Klein describes? What "reassuring adventure" about a " power larger than life" would make appropriate subject matter for this work?

Klein's political analysis of the special effects employed by Baroque churches points towards an answer:

> *"These immersive nightmares reflected very unsteady alliances between the prince and the merchant class, let us say occluded and distorted alliances...Thus Perspective Awry as a form of story honored a partnership that was crucial to the early modern state, where commerce sponsored what little remained of feudal authority, inside the newly minted princely state."*

The particular character of Baroque special effects – characterized by disturbing distortions of the order of perspective – reenacted the instability of the political order that commissioned it. What equivalent tension could a technological, computer-saturated form of special effects explore?

What answer could be more appropriate than the very story that began this thesis paper: Doug Engelbart's encounter with LSD at the International Foundation for Advanced Study in the 60s. I found an interesting parallel between that moment and the political dynamic Klein describes in Baroque special effects. Just as Baroque perspective games resonated with the instability of the Baroque political environment, the hybrid, inter-disciplinary nature of special effects image-making techniques resonated with the interplay between the military industrial complex and the counter-culture that formed the underpinnings of contemporary special effects technology.

In order to tell this story, I began with an image of the complete scene, sketched in 3D modeling software in the style of the "previz" process which is ubiquitous in contemporary special effects movie-making.

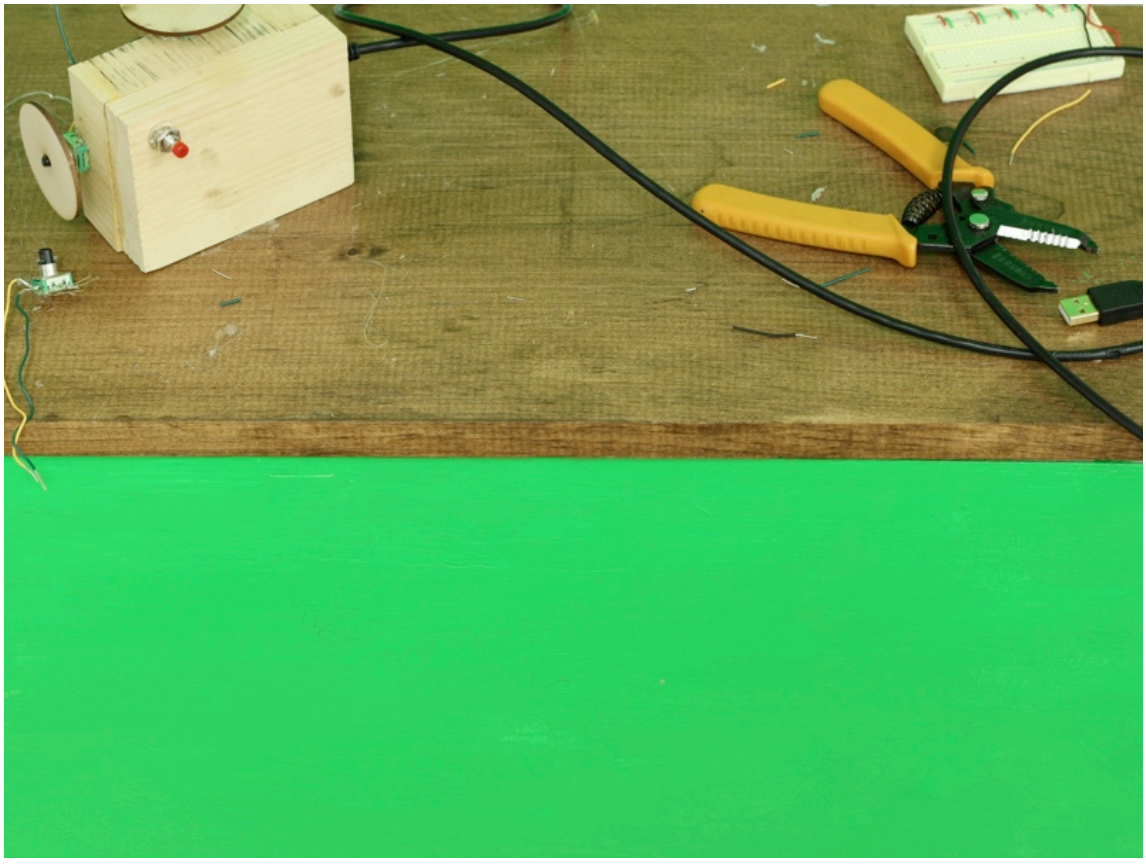
I then broke this image down into its individual components (or "units") and considered what special effects techniques were most appropriate to represent them.

The first unit was the toilet. I decided to produce this as a 3D-printed miniature, which could be mounted into an ad hoc "wet set" with pumped water to produce the illusion of an invisible child using the tinkle toy for its intended purpose. Since this element represents the most psychedelic aspect of the scene, I wanted its physical

presence to be the most absurd and surprising while its practical implementation was simultaneously the most technically sophisticated.

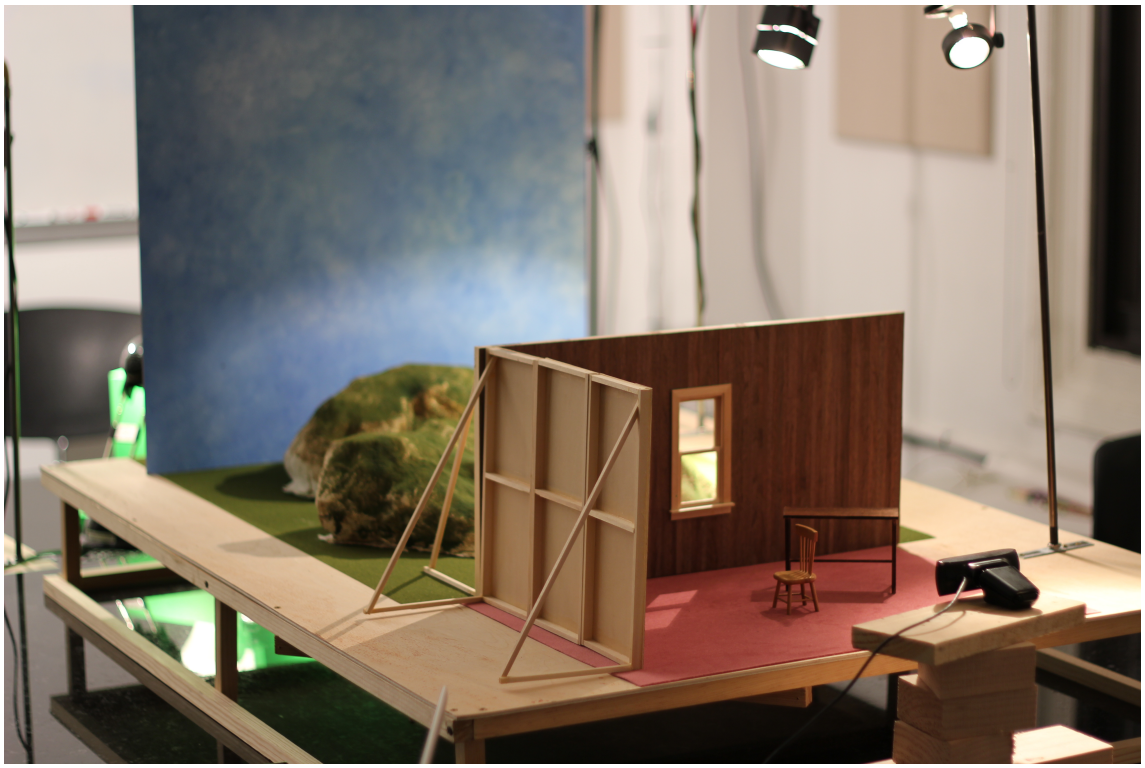
The next unit was Engelbart himself. I wanted both to make Engelbart the center of the composition and to find a way to embody his seemingly inaccessible catatonic state. Hence, I chose to represent him using a digital model that I could puppet via a motion capture system. I wrote custom software that used data from the Microsoft Kinect camera to detect my motions and used that data to manipulate positions of the various parts of the digital model.

The third unit was the SRI engineers, busy at work fiddling with a prototype of the lab's most famous invention: the computer mouse. Even though my composition relegated them to a corner of the scene, they played an extremely important symbolic role: representing the techno-culture in balance with the counter-cultural element of Engelbart's psychedelic vision. Hence, I decided to use the physical scale of this



component to emphasize its importance despite its role in the composition. I built the engineer's work station at full scale. In fact, I went further and actually turned the construction of this part of the scene into something I could embody as well. I prepared a wooden desk, gathered the electronic components necessary to build a working mouse in a method as historically accurate as possible (I used rotary encoders just like the SRI engineers did in their prototype, but I used an Arduino, technology that was not available to them). Once I had the mouse prototype working, I glued down all of my tools and detritus to the desk, creating a highly realistic messy engineer's workspace. I then mounted this desk onto a green screen base and placed it in front of a green screen backdrop so it could be composited into the final scene.

The final unit was the International Foundation for Advanced Study premises themselves. I took this unit to represent not only the IFAS itself, but the surrounding Bay Area environment whose culture was extraordinarily important to the history I was trying to monumentalize.



Before it was known as Silicon Valley, the Bay Area was referred to by its traditional indian name, translated as "The Valley of Heart's Delight".[3] This name embodied many of the specifically Californian counter-cultural values of infinite possibility and self-transformation at the heart of this story. The presence of this name in the pre-history of technology's most famous landscape provided a powerful poetic context for the whole project and I wanted to acknowledge it by emphasizing the landscape strongly.

Similar to my approach with the engineer's workstation, I chose to overcome the landscape's small presence in the actual composition by giving it a large and impressive physical presence: I built a detailed miniature model of both the IFAS interior and the rolling hills of the Stanford area. I used traditional set piece construction techniques in the building of this miniature so that the whole thing would look like a tiny movie set and the viewer would feel like they were walking onto the backlot of a real special effects production, albeit a very small one.

Once I had constructed all of these physical and digital objects, I placed commercial web cams in front of them and built custom software to combine the images from these cameras together through compositing. Though I may have been able to achieve more convincing effects by using off-the-shelf compositing tools or higher resolution images by pre-recording, I wanted to learn as much as I could of the logic embodied in these systems and my emphasis on having a live-constructed image in order to dramatize the process of compositing (in combination with my limited budget) required me to build my own system.

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[3] Michael S. Malone, *The Valley of Heart's Delight: A Silicon Valley Notebook, 1963-2001*. Wiley 2002.

Precedents

Ideas related to this approach to combining objects into images have been explored by other artists whose work has informed and inspired my current exploration.

Jennifer and Kevin McCoy use miniature scenes and multiple cameras to create sculptures that produce narrative by combining images in sequence over time. Their work is deeply engaged with the genre conventions of cinema, especially those genres that use montage to produce their effects: horror, noir, thriller, etc. It also interrogates the social conventions of cinema, particularly around family and gender.[4]

Kyung Woo Han uses live video to create elaborate illusions that play on conventions of monocular perspective. He assembles complex, seemingly chaotic, sculptures from mundane objects that, when viewed through a carefully-positioned camera, produce a surprisingly coherent two-dimensional image: a color-bar test pattern, a stylized drawing of a chair, or a split-screen view of two different spaces, for example. Where the McCoys use multiple images in series to explore narrative, Han uses the camera's collapsing of space to explore perspective, perception, and illusion.

Finally, the Museum of Jurassic Technology deploys special effects image-making techniques within the theatrical setting of a museum in order to produce moments of wonder and to illustrate the extremes of eccentric human creative achievement. Unlike the previous two examples, the MJT rarely uses screens as its primary medium. Instead, it uses an older subset of the special effects vocabulary that derives from museums,

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[4] I worked for the McCoys as a studio assistant and fabricator for much of 2010 and continue to have a working relationship with them.

carnival shows, theatrical illusions, and stage magicians. This subset involves careful use of mirrors, lighting, and optical illusion. Interestingly, David Wilson, the founder of the MJT has a background in the special effects industry and uses many related cutting-edge techniques in the museum's production process even though its public aesthetic is quite antiquarian.[5]

"Number Eight Fencing Wire"

Thus far, I've focused on special effects' relation to high technology and the production of seamless illusionistic environments. However, one of the most compelling features of the field as a model for artistic practice is its tradition of constant improvisation and utilitarianism, of getting the shot by whatever means necessary. Because the practical challenges posed by each film and each shot are wildly varying, as craftsmen, special effects artists rarely employ overarching methodologies or standardized industry procedures. Instead they deploy a widely varied toolkit of techniques for achieving the range of required effects – many of which date back to theatrical traditions of past centuries and have been passed down orally through apprenticeship.

At Weta, a New Zealand-based special effects firm that is one of the most prominent operating today, they refer to this approach as "number eight fencing wire," a traditional expression intended to evoke New Zealanders' frontier spirit of making

[5] I worked for the MJT writing grants in 2002-2003 and have an ongoing relationship with David Wilson and other members of the museum staff and community.

due with whatever mundane materials are available to hand, of improvising with them to produce whatever is needed.[6]

This improvisatory ethic is furthered by the fact that special effects artists work behind-the-scenes of the movies whose illusions they create. Their final product is not the actual physical and digital apparatuses they produce, but instead a cinematic image that belies the unfinished and fragmentary nature of those apparatuses.

My project incorporates this behind-the-scenes aesthetic as an important part of its visual vocabulary. It makes the process of compositing visible by breaking down the slick surface of the final image into discrete units.

The artist Robert Smithson theorized this kind of process aesthetic as key to understanding large-scale systems and logics of production, especially physical infrastructure:

> *"The process [of production] may be viewed in stages, thus constituting a whole 'series' of works of art from the ground up. Land surveying and preliminary building if isolated into discrete stages may be viewed as an array of art works that vanish as they develop."*[7]

For Smithson, the in-process versions of an industrial process that exist along the way to completion constitute art works in themselves. In my project, these works remain present while still producing the "final" work or composite image. Each portion of the image continues to inhabit its own production environment, a physical or digital backlot set, while also participating in the network of units that makes up the final

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[6] Weta technicians discuss this in The Lord of The Rings Special Edition DVD production documentary.

[7] Robert Smithson, "Towards the Development of an Air Terminal Site", *Robert Smithson: The Collected Writings*, ed. Jack Flam, University of California Press, 1996.

image. These discrete physical and digital objects both reveal the image in construction while simultaneously maintaining their own integrity as "stages" in Smithson's sense.

This interpretation of Smithson and its connection with special effects filmmaking derives from artist John Powers' essay "Star Wars: A New Heap Or: How I Learned to Stop Worrying and Love the Death Star."[8] In that essay, Powers explores the political ramifications of Smithson's process aesthetic in contrast to the seamless modernism that came before it. In particular, he draws a connection between Smithson's position and Jane Jacobs' critique of Le Corbusier's centralized utopian urbanism. To Powers, both are examples of effective resistance to the dehumanizing excesses of modernism.

Powers also applies this same distinction to an approach to special effects filmmaking, casting the rationalist minimalism of Stanley Kubrick's *2001* as the apogee of modernist abstraction as opposed to the Smithsonesque process aesthetic of George Lucas's *Star Wars*:

> *"Kubrick's film presented a future of company men moving with assurance and clear intention toward a godlike minimalist object. Lucas, on the other hand, gave us a slapdash world of knuckleheads pursued by industrial-scale minimalists."*[9]

This same political and aesthetic dynamic operates in the story I'm attempting to depict: Doug Engelbart's group of rebels navigating an unstable course between the countercultural world of the hippies and the conventional world of the military industrial complex. Where both the hippies and the Defense Department had totalizing

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[8] John Powers, "Star Wars: A New Heap Or: How I Learned to Stop Worrying and Love the Death Star" http:///canopycanopycanopy.com/4/star_wars__a_new_heap

[9] ibid

utopian visions for the technological future, Engelbart's project combined ideas from both camps and emphasized an iterative always-ongoing "bootstrapping" process over a particular static outcome.

Like Bogost's networked unit operations, Smithson's process aesthetic, and Engelbart's bootstrapping approach, my project maintains a "number eight fencing wire" ethic, revealing the process of special effects image construction and emphasizing the incompleteness and informality inherent in any human technology, no matter how magical its effects.