An Unnatural history

Sarah Hearn

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An Unnatural History

By

Sarah Hearn

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of
Master of Fine Arts in Imaging Arts

School of Photographic Arts and Sciences
College of Imaging Arts and Sciences
Rochester Institute of Technology
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Acknowledgements

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Abstract

*An Unnatural History*

by

**Sarah Hearn**

B.F.A., Photography and Museum Studies, College of Santa Fe, 2001  
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An Unnatural History is an installation that inhabits the space between the continuously shifting realms of science, pseudoscience and science fiction. This project documents the (fictional) discovery of a taxonomy of marine life containing and cooperating with the elements from the periodic table. As science and technology progress, we are constantly faced with redefining, reinterpreting and reconfiguring what we thought we knew about the world around us and previous scientific “facts” are revealed to have been constructed “beliefs.” Using multiple modes of representation, An Unnatural History draws attention to the real, the imagined and what it means to visualize biological life and phenomena that are often invisible to us at first glance.

You are invited to join the Institute of Aquatic Research, as together we make unbelievable discoveries deep within the oceans, collect empirical data and struggle to organize, classify and determine the meaning of our findings and our place within this system. It is my hope that this experience cracks the hard shell of certainty and if only for a moment, suspends you in a state of wonder and disbelief. The power of imagination should not be ignored. It is what gave life to this idea that lay dormant with possibility and power.
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Prologue - The Cycle Begins

“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.” Charles Darwin, Origin of the Species.

**SCIENTIFIC REPORT**

Sarah Hearn, Researcher, The Institute of Aquatic Research (IAR)

Abstract Goal: Investigate and record behavioral adaptations between marine organisms and periodic table of elements

Status: Inconclusive but probable

The aim of this report is to investigate and document the recently discovered taxonomy of marine life containing and cooperating with the elements from the periodic table. Evidence is indicating that the elements within the periodic table not only act as building blocks for life, but also appear to exist as an open source for life to borrow from, or adapt with. Many species that fit this model have recently been identified. My team and I are working to determine if at least one organism exists for each of the 118 elements. The organisms discovered to be part of this order display genetic adaptations allowing them to adopt and incorporate the elements with their natural behavior- an excellent example of accelerated natural selection. But is this really natural?
The discovery of these adaptations is especially curious in the cases of elements thought only to exist for fractions of a second under specific laboratory conditions. Some of the species suspected to be among this group are showing rapid adaptations, while others are revealing ancient mysteries of the ocean depths. The Institute of Aquatic Research is part of an ongoing study to survey this rare fauna. Through this research, the team aims to document these creatures in their natural habitat, study their behavioral characteristics and map their phylogenetic relationship to known marine life found within the world’s oceans. If these creatures are in fact engaging in such hybridized cooperation, the oceanic tree of life might look much more like an entangled fishing net rather than the idealized tree we have come to know as a reference.

Fig. 1 W. Ford Doolittle, Chart of Primitive Bacteria, 1999
Fig. 2 Ernst Haeckel, *Tree of Life*, 1879
The majority of the teams’ research has been conducted on board the Institute’s floating laboratory, known as the Kraken. The Kraken is a modest vessel capable of storing a 2-person submarine (Neptune), diving equipment for the crew, and the collection of specimens obtained on this expedition, which resembles a modern day cabinet of curiosities from the deep. The crew aboard consists of: head researcher and project manager, Sarah Hearn, diving expert Lyle Smith, microbiologist Mavis Brasher, and captain Eugene Merriman. The voyage began in the fall of 2008 at the port of Wilmington North Carolina, sailed south east through the Atlantic Ocean to and on into the Indian Ocean near the Tropic of Capricorn. The journey continued eastward and was completed in the Pacific Ocean at the deepest spot on earth, the Mariana Trench (11°21' North latitude and 142°12' East longitude) near the Islands of Japan.¹

I believe this research is timely. It corresponds with many other reports of new evolutionary adaptations that suggest mutable change and collaboration is rampant in marine ecology. In the Sea Census of Marine Life,² 10-year survey of the world’s oceans, scientists estimate that for every known organism in the ocean there remain four unknown. Recently more than 6,000 previously unidentified marine organisms were added to the catalog of life. With the onslaught of newly discovered organisms, many reports of adaptive behaviors or bizarre evolutionary changes have emerged. These

¹ This description was inspired by a culmination of sources including: Wes Andersons, Steve Zizzou: The Life Aquatic, Charles Darwin’s, Voyage of the Beagle, Jules Verne’s 20,000 Leagues Under The Sea and Herman Melville’s Moby Dick. ² Decade of Discovery, The Sea Census of Marine Life, 2010 http://www.coml.org/Highlights-2010 (accessed August, 2010).
accounts include the photosynthesizing sea slug *Elysia chlortica*, the immortal jellyfish, *Turritorpsis nutricula*, and the behavioral adaptations of several species of oil consuming microbes which are currently being studied in the Gulf of Mexico after the tragic oil spill from BP’s deep-sea well.

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Chapter 1: Introduction - Prophase

I grew up land-locked in Oklahoma. It seems fundamental to be in awe of nature and all its phenomena when you are raised in a place where homes and cities are periodically wrecked by the fickle mood of the weather. Witnessing weather phenomena such as tornadoes serve as a reminder that humans are no match for the potency of the natural world. We live day-to-day believing a false notion that we are dominant over the land. We buy and sell land. We build architectural structures on it and establish systems of travel crisscrossing the continents as if they are ours to scar. These man-made marks are simply illusions of security. The control we think we have can be torn to shreds in seconds with one fleeting funnel cloud. The same can be argued for any powerful natural disasters such as earthquakes, tsunamis, volcanic eruptions, and of course, hurricanes. I respect nature. I sometimes fear nature. There is a desire in me to embrace nature, to seek what is unknown about it, to learn from it and cooperate with it; yet in contrast, there is that part of me that desires to tame it, modify it, manicure it to my own liking. After all, I have a pet cat and several houseplants and I love to garden. I want to learn natures’ defense mechanisms and understand its cunning ability to fool the human psyche. I want to cooperate with nature in a new kind of way.
I remember the fascination I felt at a young age when I lifted up a large rock in our backyard and discovered a mess of roly-poles hiding in the red earth beneath it. I was not yet aware of what these things were called, but I was intrigued by their prehistoric plated bodies and charmed by their many legs. I envied their protective armor and their ability to curl into tight little balls to shut the world out. I would have given anything to shut the world out, or to have imbricated armor to shield my sensitivity. I was and still am, tremendously sensitive. I remember thinking these bugs had to be ancient. I wondered if anyone else had ever found them? What was I going to name them? Later that day, I was shocked to learn my older sister had already encountered these critters, so my dream of introducing them to the world was quickly dispelled. If she knew, most people knew. They already had a name, in fact many names all of which were fitting: pill bugs, armadillo bugs, roly-poles, and wood louse.
I fantasized that these creatures had lived during the time of the dinosaurs, but shrank in size to avoid extinction. They appeared to be tough little warriors capable of surviving millions of years of difficult living conditions, so my theory seemed sound--at the time. I thought extinction only happened to things that were large enough to be spotted easily and hunted by people. My reasoning was limited. I was six. Little did I know the dinosaurs were killed off long before human existence by a massive natural disaster of worldly proportions. Not even they could survive the wrath of nature.
Years later, in a high school zoology class, I learned that roly-polyes are a type of crustaceans. Although they didn’t live 600 million years ago, they had relatives that did. More recently I learned that these crustaceans are closely related to various species of shrimp and lobster and a gigantic sea dwelling version of the roly-poly, *Bathynomus giganteus*, which was discovered in the late 1800’s.

Fig. 5 Richard Fortey, *Bathynomus giganteus*, 2004
In 1998 I had the opportunity to go scuba diving. This experience changed me. I felt as if I had visited another planet for a few short hours. Weightless, floating, terrified, awe inspired. I remember feeling so small and vulnerable in the vastness of the ocean. The insignificance of my existence was made clear to me that day. This abundant planet does not need me, or anyone else for that matter. I am, we are-- privileged to have the opportunity to inhabit it. I felt a new desire to make my existence matter. If I am going to take up space on this planet, no matter how small and insignificant it might be, I best do something to contribute to it.
We humans are symbolic animals—both creators and creatures.

Chapter 2- The Classification Conundrum: *Metaphase*

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I consider myself an orderly person with a compulsion for detail. I function in this world with the help of lists, spreadsheets, tasks and charts. I love to cross things off of my to do lists and shuffle my sticky notes from place to place. Sometimes I even include things like “take shower” or “brush teeth,” just so I can obtain the satisfaction of crossing it off later in the day. Traces of this compulsion are exemplified in my artwork. When I draw, I work myself into a tiny microscopic space made up of thousands of dots and lines. The more minute the drawing becomes, the better I feel. The ritual practice of

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Fig. 6 Sarah Hearn, *Task List*, December 7-8, 2009
drawing provides me with a form of personal escape, innovation and false notion of control. When I am drawing, I am unaware of space and time. I experience the satisfaction of entering my own fabricated universe of possibility. The feeling of potential I experience when I enter this space is nothing short of overwhelming.

Fig. 7 Sarah Hearn, Drawing, *Oxycoccos bulbosa*, 2009
When I first embarked on this project, I assigned myself some strict limitations. These limitations introduced themselves at different times throughout my creative process. Sometimes they were conscious choices and other times they were preferences that emerged from my unconscious that I in turn, decided to embrace or cultivate. They include:

- The choice to create scientific illustrations and print them photographically
- A tiny size restriction- each negative a size of 3.50”x 4.25” and each print 4” x 5”
- This work would represent a catalog of sea life
- All of the organisms are invertebrates or microscopic

I experienced a certain form of freedom by devising this structure. This project explores and illustrates my own desire to tamper with natural systems and suggests one potential outcome of such interference. Western culture is obsessed with modification, improvement and progress. Genetically modified food and animals are becoming dominant in our available food supply. Plants and animals have long been selectively bred based on cultural preferences. Large numbers of people visit plastic surgeons to improve physical appearances. Computer hardware and software are rapidly phased out for newer “better” versions. Throughout history, our tampering has produced unexpected results, yet we continue to believe we can find a way to live harmoniously with nature, while simultaneously trying to control it. But it is difficult to control that which we do not understand. Now is the age of designer babies and genetic modification. Now is as good of a time as any to rethink the consequences of such interference.
It is true that all ocean life exists in part because of the elements carbon, hydrogen, oxygen and sodium. Yet there exists a population of marine organisms that contain concentrated forms of elements from the periodic table. Their stories are a more eloquent mix of myth and history than I could possibly dream up. My favorite is the ancient story surrounding the bromine rich sea snail *Murex brandaris*, which is responsible for producing the dye Tyrian purple. Legend credits the discovery of this dye to Heracles, or rather his dog whose mouth was stained purple from chewing on the snails along the Levantine coast. King Phoenix received a purple-dyed robe from Heracles and decreed the rulers of Phoenicia should wear this color as a royal symbol.⁵ Royalty did in fact become associated with this color—all from the stains of mucus from a slimy sea snail.

A few other examples of this elemental incorporation less steeped in legend include the marine protists Gromia oviformis, whose tough shell contains exceptionally high concentrations of iron. In addition there are various species of sea sponges and a variety of mollusks rich with calcium based on exteriors and shells. Now, a litany of sea life has been poisoned by other elements such as mercury, cadmium, chromium, silver and lead contamination. This is due in part to ocean pollution from industrial sites around the world.
Chapter 3- On Reconstruction- *Anaphase*

I created *An Unnatural History* to call attention to the precarious relationship mankind has with the natural world. The unstable state of our systems of knowledge paired with imagination of what can and might be possible has for me produced “copious growth.”

Each organism created and/or discovered within my catalog possess both biological characteristics and elemental properties. In some ways, I made efforts to mimic a controlled laboratory experiment; in other ways, I have allowed the work to take on a life of its own—to evolve naturally. I chose to crossbreed the periodic table with the Linnaean classification system. The result is a new, hybridized paradigm that explores the possibility of the natural world integrating the unnatural and examines evolutionary growth beyond the constructs I have designed for it. Systems help us organize information and define boundaries. Yet, these boundaries become unclassifiable, semiotic, imbricated and untenable. They break down and expose our lack of knowledge. They reveal our vulnerability. Below is a brief description of the two systems responsible for maintaining this catalog of marine life.

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6 The word choice copious growth is borrowed from the description of the experiments performed by John Tuberville Needham and Georges Louis Leclerc Buffon in Marston Bates’s, *The Nature of Natural History*, (Princeton University Press, 1990) page 58.
System One- Periodic Table of Elements: (The medium long form display) as Eric R. Scerri states in, *The Periodic Table: Its Story Its Significance*, “The story of the periodic system is the story of the blending of chemistry, Pythagorean Theory and most recently, quantum physics.” Here, the elements are ordered by their atomic numbers, but there are many ways of ordering this system for different purposes. It is continuously modified and added to. It represents a mix of natural occurring elements and ones that can only be byproducts of lab activity. A vivid imagination and the periodic table offer rich breeding grounds for generating spontaneous life.

System Two- The Linnaean Taxonomy: a rank-based classification system of living organisms based on physical and observable traits. It is commonly attributed to Carolus Linnaeus, although he did not invent the concept. Linnaeus was responsible for putting this system into practice and establishing a specific hierarchy of life. This concept does not have an exact present form, as current scientific investigations are debunking the orders previously established. Linnaean taxonomy now functions as a collective term for what actually are several separate fields, which use similar approaches to classification. This system provides a foundation for basic biological nomenclature. More recently, the ability to extract chromosomes out of cells and band them (or color code them) has lead to a different understanding of genetic relationships between
organisms. The information revealed to us through karyotypes\(^7\) is pushing us to reconsider the value of using the previously established Linnaean System.

With these two systems, I had set the standards for the life to exist, but from these standards, life grew beyond the bounds I had created for it. It became much larger than anticipated--much more alive and cunning than I ever imagined.

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\(^7\) _The American Heritage College Dictionary_, 3\(^{rd}\) Edition, 2.) A karyotype is a photomicrograph of chromosomes arranged according to standard classification.
Fig. 10, Sarah Hearn Specimens, from *An Unnatural History*, 2010
Through the process of creating this work, multiple modes of representation surfaced. My curiosity was piqued by the inextricably linked relationship of authenticity and authority. I investigated the relationship between scientific illustrations and photographic images, between collected specimens and constructed simulations and between the language itself used to describe and identify these findings. Ultimately discovering a dark space burgeoning with belief and possibility, yet lacking solid evidence or proof of anything. This practice made me eminently more aware of how easily information gets lost in translation from one form to the next. As stated by Stuart Hall, “Language is a shared cultural space through which the production of meaning and representation take place. Representation is closely tied to both identity and knowledge.”

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These photographic prints carry meaning, albeit latent, like genes in DNA, or a virus. This meaning is transmitted partially by what they are and partially by what they represent.
Below is an example of one species of jellyfish depicted in multiple proliferations. Beginning with a living *Chrysaora achlyos* observed in the New England aquarium, to an illustrated version of this creature, to a photographic print of this illustration, to fabricated observations from the field, and lastly a preserved specimen, devoid of color and life—reduced to a pallid, pulpy mass. The changes that take place from one representation to the next are visible, the slippage in representations and knowledge become more obvious. We become aware of the ways we prefer to view these organisms compared to the reality of how they actually look once removed from their natural habitat and isolated for study and observation.
Fig. 12 *Chrysaora achlyos*, Photograph, New England Aquarium, 2010
Fig. 13 Drawn Negative and Ra-4 Print of Drawing, *Chrysaora achlyos*, 2010
Fig. 14 Field Notebook *Chrysaora achlyos*, from *An Unnatural History*, 2010
Fig. 15 Preserved Specimen, *Chrysaora achlyos*, from *An Unnatural History*, 2010
On Growing Life and Believing What We Want

The idea of spontaneous generation is centuries old. Mythological tales suggest goddesses born from sea foam and, in the case of Zeus, offspring that came forth out of the most monstrous of headaches.\(^9\) Throughout history, many experiments were done to decide if it was possible to generate life from matter. Jan Baptiste van Helmont, the 17\(^{th}\) Century Flemish alchemist responsible for identifying gas in the Earth’s atmosphere adamantly believed in spontaneous generation. He performed ‘experiments’ that he believed proved his theory for making mice from dirty underwear. Although there are many variations on his ‘formula’ published, the general recipe is cited as follows: place a dirty shirt or underwear in an open barrel or pot containing a few grains of wheat and in 21 days, mice will appear.\(^{10}\) In 1668 Francesco Redi’s meticulous experiments were thought to disprove the theory of spontaneous generation. Redi placed small pieces of meat in flasks. He sealed several and left some open. The sealed flasks did not get “wormy” and those open were visited by flies and “became wormy.” His conclusion was that flies produce maggots, which turn into flies. He also deduced that worms could not be generated from meat without flies.\(^{11}\) This idea was once again revisited in the 1700’s when John Tuberville Needham collaborated with Georges Louis Leclerc Buffon to determine if this applied to all life. For their experiments, they boiled mutton broth and

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sealed it in jars. When they opened the jars several days later, they found copious growth, suggesting that spontaneous generation was possible for microbial life. It was quickly discovered that their experiments were misleading, as the mutton broth had not been boiled long enough to kill off heat resistant microbes. Although these experiments further muddied the water about whether or not life could spontaneously generate, they did call attention to the ideas of meaning and representation. Each time an experiment is tested and different results emerge, it illustrates that meaning is and always has been unstable. Facts are never fixed. As stated by Stuart Hall, “Meaning is constantly being produced and exchanged through culture. We assign things meaning with use, language, feeling and representation.”12 Michel Foucault argues that, “natural facts are discursive facts.”13

Contemporarily, we know that the antiquated notion of spontaneous generation isn’t currently possible. Yet, threads of this belief have reemerged in modern science in new, unlikely forms. It turns out there was a seed of truth to my logic at the age of 6. Although I was wrong about the dinosaurs, I was right to believe that the smaller and more concealed a living thing might be, the more likely it is to survive—or in some cases, be reborn thousands of years later. Being invisible is in fact rather powerful. In June of 2009, an article published in the journal, Scientific American reported that colonies of tiny microbial life, *Herminiimonas glaciei*, have been resurrected after spending 120,000

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years in hibernation.\textsuperscript{14} The specimen was found trapped beneath 2 miles of ice on Greenland. Researchers nursed the microbe back to life over an 11-month period. So, although we can’t start life from grain and dirty underwear, we can now bring back life that has long been dead. This practice has raised many questions in the scientific community about whether or not it is a good idea to resurrect a 120,000-year-old bug.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{herminiimonas glaciei}
\caption{Herminiimonas glaciei, Photomicrograph, 2010}
\end{figure}

Fig. 17 Anonymous, Pregnancy Figure, 1491
From Classical Times to the late Middle Ages scientific knowledge was preserved and passed on through illustrated manuscripts. It is believed that images of human anatomy originated in Alexandria in the Hellenistic period (around 200 BCE).\textsuperscript{15} Copies made from these manuscripts were increasingly stylized and the information passed on likely got misconstrued. With each new manuscript copy made, the potential for human error and exaggeration was introduced. Because none of the Greek prototypes survived, it is impossible to speculate exactly what the original subjects looked like, but empirical observations leads one to believe this illustrated representation of a pregnant female was not an accurate depiction of an Italian woman in 1491.

There was a latent need for photography as early as the 1400’s. In 1490 Leonardo da Vinci expressed the important role of images in describing the complexity of natural phenomena. As quoted in the essay \textit{Photography’s Illustrative Ancestors: The Printed Image}, by Mimi Cazort “How in words can you describe a human heart without filling a whole book?”\textsuperscript{16} This new emphasis on accurately illustrating such observed phenomena resulted in a desire and demand for more accurate rendering techniques. Printmaking and the Press invented in 1450 were helpful in this capacity, but it was not an absolute. Tools such as the camera obscura were introduced as aids for more accurate illustrations. Scientific knowledge proliferated and was disseminated due to greater ease of duplicating illustrations and text.

As the centuries passed, science and printmaking developed symbiotically. In fact, it is quite possible that the technical demands of scientific illustration prompted certain developments in printmaking technology. The empirical mode of observation manifested itself in more quantitative charts, tables and diagrams that pictured scientific knowledge. Scientists in various fields concerned themselves with developing new taxonomies for the natural world. The process of representing and describing nature was magnified. Methods of classifying and defining natural phenomena affected the format, context and order of scientific illustration. Things were often illustrated in sequences revealing multiple views of the specimen. Scientific illustration became lexivisual.

Methodical study of the natural world lead to the establishment of repository collections for specimens and ephemera. Eventually this gave rise to cabinets of curiosities throughout Europe. These collections laid the groundwork for the first natural history museums. At the turn of the 17th Century, science museums were established, yet science was stuck in a strange limbo between societal beliefs of creationism and empiricism—an issue that still polarizes contemporary debates.
Fig. 18 Ole Worm: *Musei Wormiani Historica*, 1665
So is Seeing Believing?

“There may be fairies at the bottom of the garden. There is no evidence for it, but you can't prove that there aren't any, so shouldn't we be agnostic with respect to fairies?” Richard Dawkins, *The God Delusion*.

Cryptozoology has long since plagued science. Fantastical tales of animals that have yet to be proven have been rampant throughout various cultures and histories. This classification of organisms knows no restriction on size as creatures such as the Yeti and Nessie the Loch Ness Monster are described right next to fairies and trolls. Here is an example of 17th Century illustrations of dragons that were believed by many to exist.

![Image of dragons](image)

Fig 19. Ulisse Aldrovandi, *Serpentum et Draconum*, Illustration, 1653
Italian Naturalist, Ulisse Aldrovandi had assembled one of the most spectacular cabinets of curiosities of the 17th Century with over 7000 specimens. Research suggests Aldrovandi had a collection of dragons and monsters fabricated by local artists because he believed so strongly that these creatures existed, but could not find them in the wild to collect. This is an early example of science fiction finding it’s way into the vernacular of natural history.

Throughout history, the veracity of scientific illustrations has been interdependent on the knowledge base of the reporting scientists. In the 17th-18th Century scientific inquiry became more clear and organized. This trend of organization and refinement continues through today, though we have not yet escaped the fallacy of our own limitations that elude us. Each new layer of information adds complexity—yet each new layer gets further from the origin of what we once thought was true.

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Here are two examples of remarkable historical illustration. The John James Audubon image attempts to describe the flamingo’s natural habitat, a place Audubon himself had not visited. The illustration on the right by Ferdinand Bauer describes an iris in detail, but the specimen has been isolated from its natural surroundings and cut away to show different characteristics on a flat plane. These images call attention to the inability of scientific observation to result in an objective transcription. As stated in the introduction of the Scientific Illustration Guild Handbook, “Aesthetic qualities give
illustrations life and a measure of charm. These will help put over the facts and fix them more firmly in the readers mind.” These images are meant to serve science and the illustrator should always work with the scientist to determine the taxonomic characters that should be emphasized.”

This text also recommends that illustrators view a variety of specimens to better judge normal conditions. Scientist should point out any distortion of a specimen that needs correction and the restoration explanation should be provided. These guidelines further provoke complicated questions of representation. For example, when an illustrator is representing an organism, should the drawings be an exact portrait of that individual specimen, or should it be generally representative of the species?

These points highlight the precarious relationship between photographic documentation and scientific illustration intended to elaborate or prove theories, facts, or illustrate advancements in research. These representations are contextualized and determined by a small handful of individuals with personal preferences and potentially skewed convictions. Subjective fact is dissolved into objective witness.

In 1859, Charles Darwin published *Origin of the Species* and revealed to the world his theory of evolution. Shortly after, changes in landscape painting emerged. Geological layers depicting fossils and sedimentary rocks became visible. Painters such as Albert Bierstadt, Thomas Moran and William Dyce created landscapes that were revealing a history of their own—making geology much more than a backdrop for human activity. This new vision of the earth’s history unveiled previously unthinkable

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revelations and proved that where there is no perceptual set or semiotic structure to make sense of visual data, it is not truly seen.¹⁹

Fig. 21 Anonymous, *Illustration of a Sea Cucumber*, 1917.

In this anonymous illustration of a sea cucumber form 1912, the image attempts to show the innards of something that could not be seen without the aid of technologically advanced optical devices, or severe dissection. Furthermore the sea cucumber exemplifies lexivisual content and is likely influenced by the x-ray technology accidentally discovered by Wilhelm Roentgen in 1898. Both the illustration and the photographic x-ray convey biological knowledge while also functioning as aesthetisized representations of the natural world.

Fig. 22 Joseph Maria Eder, Radiograph, Frogs 1896
It was no accident that one of Daguerre’s first successful images was a cabinet of fossils. The subject matter reflects the popularity of collecting among natural philosophers and scientists during the 19th Century. This image also alludes to idea that photography could, in the future serve scientific needs in an exact and aesthetically pleasing way.

Fig. 23 Louis Jacques Mandé Daguerre, *Arrangement of Fossil Shells*, 1938
Anna Atkins was the first to link together science, photography and publication in 1843. More than any other category of scientists, botanists quickly seized the possibilities photography offered. This medium has become a simulacrum for bulky and often messy herbariums. Scientists could neatly store 2 dimensional photographic records of their specimens and collect at a greater capacity. Atkins is responsible for cataloging a large selection of British Algae specimens-- she amassed a catalog consisting of 400 individual cyanotype impressions of the specimens she collected and 14 pages of text. For me, this accomplishment incites a powerful source of inspiration 150 years later.

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Fig. 24 Anna Atkins, *Chorda filum*, 1843
Photography seemed to be the ideal medium for recording permanent records of scientific observations. The first scientific photographs were confirmations of knowledge that already existed. However it wasn’t long before scientists started to investigate what such images could tell us that we didn’t already know. This important shift in cultural thinking can still be seen in images from space and refined magnifications from powerful microscopes. Pictures serve as a way to extend the vision of man while simultaneously functioning as a medium of expression—they point to the things we want to see.

The relationship between science and photography can be described as symbiotic. Science was essential for the invention and advancement of the photographic medium, while photography gave science a new tool for unlocking the mysteries of the universe. Much like the history of scientific illustration, photographic history is fraught with non-, or para-scientific infiltrations. Images such as Bayard’s self portrait as a drowned man and the photograph of the Moon Crater Vesuvius (actually a plaster-of-Paris model) by James Nasmyth and James Carpenter reaffirm such entanglement. On the one hand, these infiltrations are inseparable from our desire to believe in the medium of photography itself, yet on the other hand; they are connected to myth and fiction leaving us to ponder if the concept of ‘a truth’ itself actually exists? Nasmyth and Carpenter desired to “educate the eye about the truth of the surface of the moon” yet achieved this goal through a process of misrepresentation or deception.\footnote{21 Edited by Ann Thomas, \textit{Beauty of Another Order}, Essay by Ann Thomas, “Capturing Light: Photographing the Universe”, (Yale University Press) page 204.}
Fig. 25 James Nasmyth and James Carpenter, *Moon Crater Vesuvius*, 1864
All life, in some capacity or another is dependent on other forms of life for survival. Life as we know it cannot survive in a vacuum. Likewise, art cannot survive without the influence of what is now and what came before. It would have been impossible for me to conceive this project and make the artwork supporting this thesis without influence and inspiration from the world around me. The life force behind this work is, in its most simple form, representation, but the scope of inspiration was vast.

Novels such as Mary Shelley’s Frankenstein, HG Wells’s Time Machine and the short stories, Blood Music by Greg Bear and The Day the Icicle Works Closed by Fredrick Pohl address the consequences of human interference with natural cycles. We live in an age where things such as stem cell research and cloning technology have made boundaries between factual science, blind faith and science fiction intangible. It is becoming increasingly difficult to define boundaries between natural systems and artificial ones. Science fiction offers us a way to test the waters before taking actions that alter life. Reading science fiction has given me permission to think about what could possibly happen as opposed to what is expected to happen. The viewer of An Unnatural History is presented with such possibility, disguised in a suit of authority, and tinged with a stain of humor.
The inclusion of my field notebook (Fig. 27) was a crucial part of this project. I believe it helped connect the viewers to the voyage by inviting them to participate in reading hand written text and tinkering with the movable parts and pages within the book. Furthermore, this object exposes the human element in an otherwise slick and somewhat believable presentation. This book pays homage to the work of Joseph Cornell (Fig. 28) and references the field observations of both scientists and illustrators that came before me. I feel a direct connection with Cornell’s subject matter, quirky humor and his love of
repurposing objects in unlikely contexts. The incorporation of text was crucial to Cornell’s work and science centric research a driving part of his inspiration.

Fig. 27, Pages from “Field Notebook”, Sarah Hearn, *An Unnatural History*, 2010
Fig. 28 Joseph Cornell, *Habitat Group for a Shooting Gallery*, 1943
I also drew great inspiration from the work of Joan Fontcuberta. The Catalonian artist considers himself to be a conceptual artist using photography. He credits his background in communications and advertising for leading him to contemplate the relationship between photography, truth and authority; a thread of connection between our work that is strong and undeniable. For his project *Secret Fauna*, Fontcuberta claimed to have discovered the long lost archive of German Zoologist Dr. Ameisenhaufen (who’s fictional name translates to “anthill”). He carefully presented ‘evidence’ for the existence of some unusual animals found in the archive including: photographs, detailed field notes, an occasional skeletal X-ray, tapes of the animals' cries, and an actual stuffed specimen. Recently, I had the honor of participating in an exhibition with Fontcuberta as part of the World Creativity Biennial of 2011.

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Fig. 29, Joan Fontcuberta, *Fauna*, 1987
Similarly, my work shares conceptual connections with artist Mark Dion. Dion’s work questions the authoritative role of the scientific voice in contemporary society. The artist examines the ways in which dominant ideologies and public institutions shape our understanding of history, knowledge, and the natural world. Through appropriation of archaeological and other scientific methods of collecting and ordering objects, Dion constructs atypical cabinets of curiosities modeled after 16th Century wunderkammerners. His work is has been described as “crossing Darwin, Disney and Hitchcock.”

I share Dion’s passion for examining the relationship between public institutions and our understanding of knowledge and natural history.

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Fig. 30, Mark Dion, Installation of *On Tropical Nature*, 1991.
Of course, the original cabinets of curiosities, where unicorn horns were found among shark’s teeth provided a spark of inspiration. These collections amassed by wealthy noblemen, exemplified an eccentric scope of taste and interests. Amongst the animals and artifacts collected lingered powerful myths with strong convictions. These motley collections evolved to become the first natural history museums. Even today natural history and science museums are faced with the daunting task of endless revision. As inaccurate or fictional items get removed from public display, their authority remains in a constant state of flux. This is often due to disproven theories, or advancements in understanding about particular species or, in some cases—fraudulent objects are revealed from within a museums’ collection.24

The development of An Unnatural History required many contemporary museum and aquarium visits. Yet, the American Museum of Natural History (AMNH) in New York City and the Museum of Jurassic Technology (MJT) outside of Los Angeles became the most important references. Visiting the AMNH provided me with excellent examples of convincing and not-so-convincing displays. The MJT, a contemporary institution comprised of odd phenomena and para-scientific investigations is the creation of artist David Wilson. Wilson, who also acts as the museum ‘docent’ is part curator, part performance artist, part historian. The space is filled with exhibits that blur the boundaries between fact and fiction. Learning about the MJT opened me up to the idea of presenting viewers with the responsibility of deciding for themselves what to believe and what to disregard. I discovered that the power of uncertainty becomes the most

convincing and compelling force. The experience of completing this project has given me new insight. I have learned to appreciate the uncomfortable space in which my artwork resides. I have also begun to embrace the elements of humor and fantasy that give the viewers access to the work. Because of this audiences of multiple ages and backgrounds have been thoroughly engaged with the project—something I could only previously dream of accomplishing. Yet for me, each of these new insights gives rise to more questions about the human role in our earthly ecosystem and suggests additional aspects of our fragile relationship within and among the natural world.
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