Shaped in Time: a visual study on evolution

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i. *Abstract*

This thesis discusses the motivation, process, and investigation of materials associated with my art practice, specifically my exploration on the topic of evolution and duration through a variety of mediums: printmaking, bookbinding, stitching, sculpture, and film. The conceptual basis of my work largely derives from examples of evolution found in nature, for instance vestigial organs or behaviors that provide evidence to a specimen's preceding form. Biological theories, and the technological advances that surround our modern era also influence this thesis work, including our tendency to mimic nature when creating our tools, and the relationship between natural and synthetic material. This paper describes how considering these topics over the past two years of my MFA graduate program has encouraged my studio practice to develop in new unexpected ways. Included in this thesis is a curriculum vitae, artist statement, and a CD with image list containing documentation of my thesis work.

I. *Introduction*

My MFA thesis exhibition *Shaped in Time* revolves around the subject of evolution, and evidence of duration found in the organisms and objects of our world. Through various mediums, I explore the physical connections that link the present with deep time—proof of origin, and clues to a previous existence. The following is a brief introduction to the conceptual basis of my work, as well as a preview of the influential authors and visual artists who will be discussed further in this thesis.

My interest in evolution is rooted in the scientific discoveries that support it; I find our ability to look at natural remains and decipher information about the concealed past fascinating. A large portion of the work created for this thesis references biological vestigiality, for example, rudimentary hind limb bones that remain part of a whale's skeletal structure today, though their legs dissolved millions of years ago. Vestigial organs or behaviors are traces of the past; through evolution, biological vestiges have lost all, or the majority of their original function. These useless traits that remain are evidence of evolution, and suggest physical transformations that occurred over time. Living organisms contain the past, carrying it around with them—a reminder of their preceding forms.

Introduction to the topic of evolution in my work occurred during my initial semester of graduate school, and directly stemmed from my first visit to The Wagner Free Institute of Science. This Philadelphia institution was established in the mid-nineteenth century to provide free science education. The Wagner has an extensive collection of natural history specimens, including everything from insects and shells to reptiles, birds, and mammals. The specimens were arranged in the 1880s

according to principles of Darwinian evolution, laid out from the most simple organism to the most complex, ending with a modern human skeleton. Darwinian evolution refers to the theory of biological evolution credited to Charles Darwin, which posits that all species develop gradually through the natural selection of inherited traits that increase an organisms ability to survive and reproduce (Medical Dictionary). Unlike its 19th-century contemporaries, the Wagner's arrangement remains unchanged; not only do the specimens of the collection hold information about the past, but the museum itself acts as an artifact, providing evidence of how humans once *examined* the past.

Although The Wagner was not the first museum of natural history I wandered through, it was the first of its kind, a museum "fossil," that I experienced. An interesting sensation of time emerged while examining the collection. Even though the collection occupies a fair amount of space, the perspective of the duration of our existence became skewed when the specimens were observed chronologically in a short amount of time, contrasting the immense span of the world's history. I was able to experience the entirety of life emerging in less than an hour, simply by walking from one side of the room to the other. Our brief existence as a species was magnified when viewing the numerous species that preceded mankind.

While I am curious about the comprehensive transformation of species, when considering human evolution I cannot help but reflect on our current state of existence, positioned within the rapidly-changing digital age. While the natural world shifts slowly in order to progress, making slight adjustments over millions of years, the advancements made in digital technology seem to occur on a daily basis,

causing the life-span of our gadgets to be incredibly short. Consequently, in my work I consider the relationship between the evolution of natural history and the evolution of our technology. Just as excavated bones carry details of the past, our primitive technology, such as an 8mm camera or the straight-key device used for electronic telegraphs, provides comparable information, allowing us to understand how previous generations interacted with each other and their surroundings.

It is this relationship between our technology and the development of life that sparked my fascination in our tools—both organic and manufactured—and how they have been shaped through time. By organic tools I mean the tools we are given: fingernails, hair, our senses, teeth, etc. These inherited, “hard-wired” tools enable us to survive. The tools we make, although once derived directly from nature (arrowheads, wooden wheels, etc.), are now intricate machines made largely out of plastic, silicon, and metal. These artificial imitations—our computers, cell phones, cameras, and other devices—are all tools that act as extensions of our biological traits; tools that think, talk, and capture memories for us. This act of modeling our technological designs and functions after structures and characteristics found in nature is referred to as biomimicry; a topic that influenced my thesis work. Exploring how our primitive, organic tools have been reconstructed over time through the development of technology initiated the visual relationship of natural and synthetic material in my work, which alludes to the organic tools found in our bodies and the fabricated tools we constantly interact with and rely on today.

I am interested in how the accumulation of time molds and shapes, allowing for the evolution of the simple into the complex. Our world that at one time was solely

inhabited by single-celled organisms is now teeming with mammals; a computer that used to take up an entire room now fits comfortably in the palm of a hand.

The conceptual basis for my thesis work partially derives from wondrous examples of evolution found in nature (for example, the spider-tailed viper (*Pseudocerastes urarachnoides*), whose tail lure is elaborately designed to mimic the movement and characteristics of a spider in order to attract its prey, or the fact that in the embryonic stage of marsupials, an eggshell temporarily develops and then dissolves, a genetic trait passed on from ancestors). In addition to examples in nature, research and readings from philosopher Henri Bergson, scientific author Steven Johnson, and theoretical biologist Stuart Kauffman were also influential, as each of these individuals express theories of time and evolution in their writing. This thesis will discuss how these scientific theories act as a foundation for my work, as well as describe how my artistic practice has developed throughout graduate school while exploring a variety of processes and material, including printing on various and sometimes nontraditional surfaces, bookbinding, stitching, sculpture, and film. Works by the installation and fiber artist Lin Tianmiao, sculptor Patricia Piccinini, and filmmaker Gregory Godhard will be examined in relationship to my own visual art practice. Most importantly, this thesis will explore the ways in which the topics of evolution and duration have shaped my MFA studio work.

II. *Emergence*

Visiting The Wagner museum was the inspiration behind *Darwin For President*, an offset lithography flip book I created during my first semester of the program.

The book is quite small, 2in x 3.5in, and can be flipped in both directions. When flipping one direction, a series of animal drawings morph into one another. Based on Darwinian evolution, the first image is a simple organism, an aquatic creature, which morphs into a fish, then lizard, bird, and so on, ending with a man—creating a flash of evolution. When flipped the opposite direction, a series of images taken from an 8mm horror film titled *Frankenstein Must Be Destroyed*, include an iconic Frankenstein monster, and a woman screaming in terror next to the question, "What about the brain?" The creation of this book was the first time my work was directly inspired by scientific facts as well as the political issue of evolution. It's title *Darwin For President* references the 2012 United States House of Representatives election in Georgia, where Charles Darwin received 4000 write-in votes in Athens-Clarke County, to protest against Paul Broun (who won the election) and his dismissive view on evolution: "All that stuff I was taught about evolution and embryology and the Big Bang Theory, all that is lies straight from the pit of Hell" (Huffington Post). I found the contrast between my gratifying experience at The Wagner, and the current political debates quite contrasting and interesting, and wanted to explore two varying perspectives of evolution through the double-sided flip book. The flip book, which is reminiscent of a political cartoon, communicates one position on evolution that is based on scientific fact, and another which is rooted in religious fundamentalism.

While I initially employed a political perspective of evolution in my work in response to current events, I later shifted my approach to the topic. My thesis work does not express an overt political opinion, or represent a specific view on the topic of evolution. Rather, drawing from various scientific facts revolving around the subject, it is an exploration of both natural and synthetic materials. The work produced is the

result of my reaction and observations to these facts.

As my interest in evolution expanded, research introduced me to Steven Johnson, an American author whose writing focuses on connections between science, technology, and personal experience. In his book *Emergence: The Connections Between Ants, Brains, Cities, and Software*, Johnson discusses the emergence theory, which refers to complex systems and patterns that arise from relatively simple individual parts (Flanagan). An ant colony is a prime example of emergent behavior. As Johnson writes: "The whole is sometimes smarter than the sum of its parts...;" one ant alone could be described as insignificant, but several combined create a complex, organized system that is capable of generating behavior that cannot be found in the individual ant ("emergence"). Emergent features have long been discussed in relation to evolution—how our intricate modern world could unfold from a molecular chemical reaction, or the way in which the human brain has developed, relying on a mass of individual neurons firing in succession in order to produce a thought.

This theory of emergence led me to create *Accumulation,* a large, sculptural book that measures approximately 11ft in length [figure 1]. Bound with the coptic stitch—a chain stitch sewing that links across the spine of the book—it's pages are large on one end and gradually decrease in size towards the other. The larger end of the book has a page size of about 16in x 20in, and is comprised of darker colored brown paper. The pages on the opposite end decrease in size, the last page being about 1.5in x 2in, and become gradually lighter in color, ending in a bright white. The visual transition of color on the book suggests the passage of time, and each individual signature (group of pages or page) that is sewn is a single part of a greater whole. As I continued to sew this sculptural book the pages accumulated, and a

more complex structure emerged. This emerging complexity alludes to both biological systems and our complex technological tools, which are comprised of multiple individual parts.

Figure 1 Kyra Devine, *Accumulation,* 2014; coptic bound book and PVA on plaster, approximately 20in-2in x 11ft
Photo credit: John Bernardo

When considering emergent behavior and technology, I was reminded of Moore's Law, which also aided in the conceptual development of *Accumulation*. Moore's Law is a term, created by Gordon Moore in the late 1960s, which predicted that processing power in computer chips would double every two years. Not only did this prediction turn out to be quite accurate, the actual trend is for the computing power to double, while the processor halves in size. As our gadgets become more complex, they grow smaller. *Accumulation* is a timeline; as the book grows in length and shrinks in size, the structure becomes more complex.

As the structure grew in size, it also began to take on the appearance of a creature, crawling or slithering, as the binding allowed for the pages to twist and curve. Although the piece conceptually derived from the theory of emergence and Moore's Law, in the end it resembled a dinosaur fossil you might see at a natural history museum. I decided to create a plaster slab in the gallery space for the sculpture to rest upon. The slab is an organic shape dyed a pastel aquamarine. Its form echoes a piece of land, although the texture and color of the plaster allude to something slightly unnatural. The plaster form suggests a relationship between the natural and synthetic—an interaction I find fascinating, as it speaks to our reliance on artificial, man-made materials.

A plaster slab, tinted an orange-pink, was used for the presentation of another sculptural bookwork titled *Fossil Cells* [figure 2]. Intended to be a miniature test to aid in the planning and construction of *Accumulation*, this work began as a simple binding and material exploration. On a small scale, with a page size of approximately 2in x 2in, I began sewing a very long book, using a variety of bookbinding sewings and paper types. I ended up with three separate books, each measuring about 3.5ft in length. I was fascinated by the certain life-like qualities the elongated book structure began to take on through its many sections and segments of color, echoing a worm, or a strand of cells [figure 3]. Interacting with the structure was satisfying as well, as the compact sewing and exposed spine allows the book to twirl and twist. The naturalistic qualities seen in this experiment was the inspiration behind *Accumulation*. I wanted to transcribe these characteristics, but on a much larger scale. The making of this piece revealed new ways in which a book structure could move, and on a larger scale, interact in a space. As each additional sewing section lengthened the structure, its

characteristics and physical nature transformed. This process is a gradual accumulation of material over time, which alludes to the shaping of species, or our ever-changing, intricate technology.

Figure 2 Kyra Devine, *Fossil Cells,* 2014; various sewings, dyed and printed paper, approximately 3.5ft x 2in

Figure 3 Kyra Devine, *Fossil Cells,* detail, Photo credit: John Bernardo

III. *Natural vs. Synthetic*

While focusing on the topic of evolution, research lead me to examples of diverse survival tactics found in nature, from natural defense mechanisms to genetic mutations that have enabled species to evolve. I became interested in the various ways in which tools have transformed throughout history, prompting me to contemplate: What *is* a tool in the context of biological evolution? While a tool can be defined as a device or instrument that is manually operated to perform a particular function, it can also be described as anything used as a means to accomplish a task. In contrast to all of the man-made technological tools that surround us today, I began to think about our original biological tools, and how they were formed. For instance, our eyes are such crucial tools; the formation of the lens in the eye aided immensely in our evolution into a complex, dominant species, allowing us to focus on food and predators. While our primitive ancestors relied on these kinds of biological advances to survive, it is interesting how much we rely on our technological tools in contemporary society, and how they are aiding in our advancement, particularly in the fields of medicine and science.

We often design our tools in response to biological functions or systems in nature. My interest in this biomimicry led me to produce a series a collages titled *Natural vs. Synthetic* [figure 4], which reflect on the relationship between natural and synthetic materials. One example of biomimicry that inspired the exploration of this relationship is the human eye and the camera. When comparing the tissue and cells of our eyeball, and the plastic frame of a camera, I find it fascinating that our man-made camera lens can carry out essentially the same function, focusing and capturing images, as our natural organ. The creation of the collages was a way for

me to exclusively explore these contrasting materials. There are eight collages in total, which are displayed, grouped together, on the wall. The finished works are non-representational objects which are constructed from a variety of materials: synthetic materials such as polyvinyl acetate, or PVA (an adhesive commonly used in bookbinding), plastic mylar, synthetic cosmetic hair and eyelashes, Tyvek, rubber cement, a latex surface used as faux skin for practicing tattoo artists, as well as natural materials like vellum (calf skin), human hair, horse hair, claws, bones, and leather. For example, one collage is an asymmetrical circle, made from two separate pieces of PVA glue layered one on top of another, which create an orange-brown tone. Cat claws are scattered on top of the glue. Cut and fringed vellum pieces, human hair, and fake eyelashes line the perimeter of the circular glue piece. The glue provides a plastic-like surface for the natural claws to rest upon, and the fringed vellum fashions abstract tendrils that surround the surface [figure 5]. This collage, along with the others, invite the viewer to reflect on the relationship between these opposing materials, how they interact with each other, and how the organic tools of our body interact with the synthetic materials with which we surround ourselves.

Figure 4 Kyra Devine, *Natural vs. Synthetic,* 2014; various material and dimension, Photo credit: John Bernardo

Figure 5 Kyra Devine, *Natural vs. Synthetic* (detail), 2014; PVA glue, artificial hair and eyelashes, vellum, cat claws, approximately 12in x 10in, Photo credit: John Bernardo

In working with these materials, I am especially interested when it becomes difficult to discern between the natural and the synthetic, because this alludes to our attempt as humans to design tools and materials according to the characteristics of nature. Although PVA is a very practical tool used in bookbinding as an adhesive, I am interested in using the material as a substrate because of its unique quality when poured out onto a surface, and then peeled up once dry. It is flexible, yet strong, and remains transparent after lightly pigmented. In this way, PVA resembles a layer of skin, a characteristic I find alluring, and one which I take advantage of in my work, often pairing it with an opposite, organic material. Although it is essentially plastic, by

placing bones or hair on top of, or coming out of the PVA, I emphasize the skin-like nature of the material. I also utilize the flexibility of the PVA material as it sometimes stretches when being peeled away from the surface it is poured on to dry. When the PVA is poured out thick, it becomes more difficult to peel away, and the edges have a tendency to ripple as it stretches, yielding an organic, plant-like characteristic. The collages represent a fusion of the biological and the artificial, which is a marriage that is not so uncommon in our modern society, especially in the field of medicine.

Already in 2014, technological advancements have allowed for nanomotors to be steered inside of a living human cell, and a bionic hand that provides real-time feeling sensation for a patient. Moreover, engineers have recently created electronic whiskers that could allow a human-machine interface (robot) the "ability to 'see' and 'feel' its environment" (Winter). In this era of rapidly changing technology, we are constantly pushing the boundaries of where and how our manufactured tools exist, creating with biological interconnection capabilities in mind. I am fascinated by these technological advancements, which seem impossible, but particularly the way in which they emulate tools or functions found in nature. *Natural vs. Synthetic* suggests the melding between man-made and natural properties by visually weaving the contrasting materials together, combining organic tools, like bones and claws, with plastic or other synthetic materials used in the creation of our technological tools.

My interest in the relationship between evolution and technology can be linked to Austrailian contemporary artist Patricia Piccinini, who works in a variety of media ranging from painting and digital prints, to video installations and sculpture. I am most drawn to her sculptures, which provoke a unique sensation—a perfect

combination of alluring and grotesque. Piccinini captures mysterious qualities in her hyper-realistic anthropomorphic creatures when placing abnormally large ears and excessive body hair on a human baby figure, or a skin-toned form protruding out of a piece of automobile material [figure 6]. Her works, often made from silicon and fiberglass, cause the viewer to question: could this creature actually exist? Is this a real example of a genetic mutation that could one day occur, naturally or in a lab?

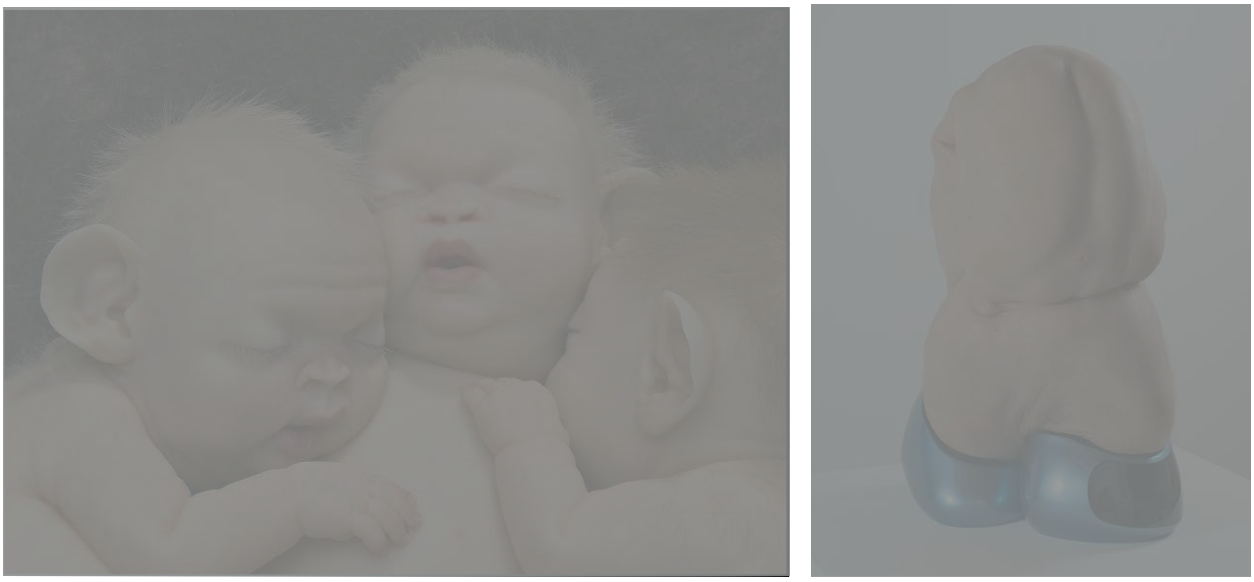

Figure 6 Patricia Piccinini, *Litter 2010* (left) silicone, fibreglass, human and animal hair, 16cm h x 50cm x 57cm*, Atlas, 2011* (right) Silicone, fibreglass, human hair, auto pain, 84cm H x 54cm x 50cm; www.webneel.com

The subject of evolution and technology is evident in the work, as she creates a powerful tension between the natural and the synthetic. According to the National Gallery of Victoria, Australia: "Piccinini has an ambivalent attitude towards technology and she uses her artistic practice as a forum for discussion about how technology impacts upon life. She is keenly interested in how contemporary ideas of nature, the natural and the artificial are changing our society" (Internet Archive). Piccinini's work is relevant to my own as we are both concerned with

the connections between nature and our human advances in biomechanics and technology. As our technology rapidly evolves, it becomes increasingly comparable to our own complex human composition. Piccinini's work often proposes a fantastical combination of physical characteristics from different species, which creates an unsettling illustration of the horrific potential in our scientific advancements. Her work prompts the viewer to question our scientific advancements, specifically in the field of genetics/biotechnology, and suggests moral concern. Although in my own work I choose not to make a political statement, I do share in Piccinini's obsession with genetic make-up, as it relates to evolutionary mutations.

Figure 7 Patricia Piccinini, *The Skywhale,* 2013; Nylon, polyester, nomex, hyperlast, cable, 112ft x 75ft x 66ft www.accaonline.org

I am particularly interested in an extremely large sculptural piece made by Piccinini, a 110ft-long balloon that floats in the air titled *The Skywhale* [figure 7]. The work is absurd and playful; a powerfully imaginative creature is removed from its appropriate ocean environment and projected in the sky. Although the head and tail of *The*

Skywhale resemble a whale, large udder-like appendages abnormally hang from either side of the creature's back. Piccinini explains, "The thing about nature is its extraordinary capacity to find ways to adapt to any environment. *The Skywhale* may appear fantastic but think about the Blue Whale—an air breathing mammal that lives in the ocean—and it doesn't seem so far-fetched" (Piccinini). She often praises amazing feats of evolution in her work, and has great respect and admiration for the natural world, which may explain her opposing views to mankind's interference. I can relate to Piccinini's process of drawing inspiration from nature or specific examples of evolution. She whimsically contemplates the alternative routes that evolution might have taken in *The Skywhale*, when she states: "...what if those same mammals (whales) had somehow evolved to take to the air? What might something like that look like?" (Piccinini). I enjoy Piccinini's playful attitude towards evolution, which is an approach I take in my own practice, especially in the making of the *Natural vs. Synthetic* collage work.

IV. *Mechanical and Biological Vestiges*

I explore the combination of natural and synthetic material, as well as the extensive qualities of PVA further in other works. The skin-like quality of PVA is enhanced when the material is stretched around objects, or used as an encasing. I utilize this specific feature in a piece titled *Genetic Vestige*, which consists of six sculptural objects made from PVA and organic materials such as bones, egg shells, and teeth. The organic materials are sandwiched between two circular pieces of PVA and the edges are sewn, sealing the objects inside. The irregular circles simulate a biological, or cell-like

form. The objects placed inside of the sealed PVA pouches symbolize vestigial organs, or pseudogenes—genes or organs that remain in a species, but have been genetically "switched off." For example, inside one of the PVA pouches are alligator teeth [figure 8], which I chose based on the rare mutation that occurs in chickens which enable them to produce teeth. Because the modern day bird emerged from a reptilian evolutionary line, when this mutation occurs, in embryonic stages, the formation of the teeth on the chick look strikingly similar to the development of teeth in reptiles. Obviously birds do not normally grow teeth, but in the occurrence of this mutation, the disabled gene has randomly been switched back on. Passed on from their reptilian ancestors, this trait is a genetic vestige, a reminder of their past.

Figure 8 Kyra Devine, *Genetic Vestige,* 2014; Six units, Screen print on PVA glue, thread, bone, teeth, eggshells, artificial fish eyes, each approximately 4in x 3in, Photo credit: John Bernardo

Inside another pouch, I have placed artificial fish eyes (used in taxidermy), which allude to species of cave fish that no longer have use for their eyes. Although these

creatures still develop an eyeball, their eyesight is completely useless due to their pitch-black environment. Over time, evolution has added a thick layer of protective skin over the organ, but the eyes still remain, a vestige from their past exposure to daylight. The artificial eyes are embedded between the circular glue sheets; the skin-like PVA material creates a layer over the eyes, encapsulating the vestiges. These inner vestigial symbols suggest a previous era, and reference how the organic tools of the body (some utterly useless), still carry traces of their past function.

The two layers of glue that create the vestige container are sewn together around the edges with the caterpillar stitch. This stitch, a decorative bookbinding method, makes a weaving pattern that resembles the letter X, if continually repeated, the top and bottom of the letter connected [figure 9]. During the second semester of the program, I began introducing the caterpillar stitch in my work, using it as a metaphor for a timeline. This decision was directly influenced by a university seminar course I took which revolved around time. The reading from this course deeply influenced my work. One piece that was particularly interesting, and gave rise to the timeline metaphor was *Creative Evolution*, by philosopher Henri Bergson. A dominating theme in Bergson's writing is the past. He argues that our experience directly corresponds to our history; at every moment, our future is overtaken by our past. As the future is unforeseeable, all we have is the past, our memories, experiences, relics. I am fascinated by Bergson's obsession with the past, particularly in relation to my own interest in physical objects that carry information about the past, linking the present to a previous time and providing clues to a former existence. Bergson's theory can be applied to evolutionary evidence such as fossil remains, vestigial organs, or genetic traits, as our present condition as a species is entirely due to the accumulation of

genetic mutations occurring over millions of years—our past.

Figure 9 Kyra Devine, *Genetic Vestige,* caterpillar stitch detail, Photo credit: John Bernardo

I am also drawn to the way in which Bergson talks about duration, and the way he describes the movement of time, the past being in constant motion, incessantly moving forward. He states, "Duration is the continuous progress of the past which gnaws into the future and which swells as it advances" (Bergson). Inspired by Bergson's depiction of the past constantly moving upon us, and perhaps by the way in which he almost violently describes it—the past not just moving towards but gnawing at the future—I use the caterpillar stitch to evoke a sense of a timeline crawling, as if alive. In my practice, the timeline caterpillar stitch encapsulates objects, binds them to surfaces, or crawls on them in mysterious ways. During this investigation in my work, I began thinking about the ways in which we are restricted by time. We cannot escape the natural order in which time organizes and transforms our world. My use of the caterpillar stitch suggests that we are bound by time, as it

constrains our existence to a specific length and location within its line.

The evolution of the eyeball is extraordinary, and it is this biological development that expanded my comparisons of the evolution of species to technological advancements. I find it easy to relate the formation of the lens, which allows the eye to focus, to that of its technological equivalent: the camera. The early stages of the eye forming in species, millions of years ago, essentially began as nothing more than a sheet of light-sensitive cells, which can be compared to primitive photography processes. For instance, Cyanotype prints are produced by coating a surface with a light sensitive chemical, and then using an object or negative/positive film to resist the light. Once exposed to light, the chemical coating that is underneath the resist (the material blocking the light) washes away in water, revealing an image. This process was used in the 19th century, most notably by botanist and photographer Anna Atkins, to document plant specimens, as the sample could simply be placed on top of the chemical-coated paper to capture its silhouette. This nearly binary process of capturing information from light can be compared to the primitive stages in the development of our eyes. Several of our primitive photography processes are now obsolete; the technological “eyes” we construct in our modern cameras are much more advanced than our human eyes, possessing a lens that can look far into space, or deep inside our own cells. Old film media is similar to biological vestiges, as it has lost its original function, and is no longer our method for capturing images.

After creating *Genetic Vestige*, I was motivated to create a technological counterpart. *Mechanical Vestige* is a large circular sculpture piece, approximately 2ft x 5ft, which hangs on the wall [figure 10]. Constructed similarly to the smaller PVA vestige

pouches, *Mechanical Vestige* is made from a slab of PVA glue. Instead of having two sheets sewn together to create a pocket, one large glue sheet is nailed directly to the wall, and 8mm film is stuffed underneath the PVA "skin." By using the caterpillar stitch, which outlines the edge of the circular glue sheet, the film has the illusion of being trapped underneath the layer of glue, pinned in place between the plastic material and the wall. Like the useless biological vestiges in nature, the obsolete 8mm film remains, a reminder of our primitive technology [figure 11].

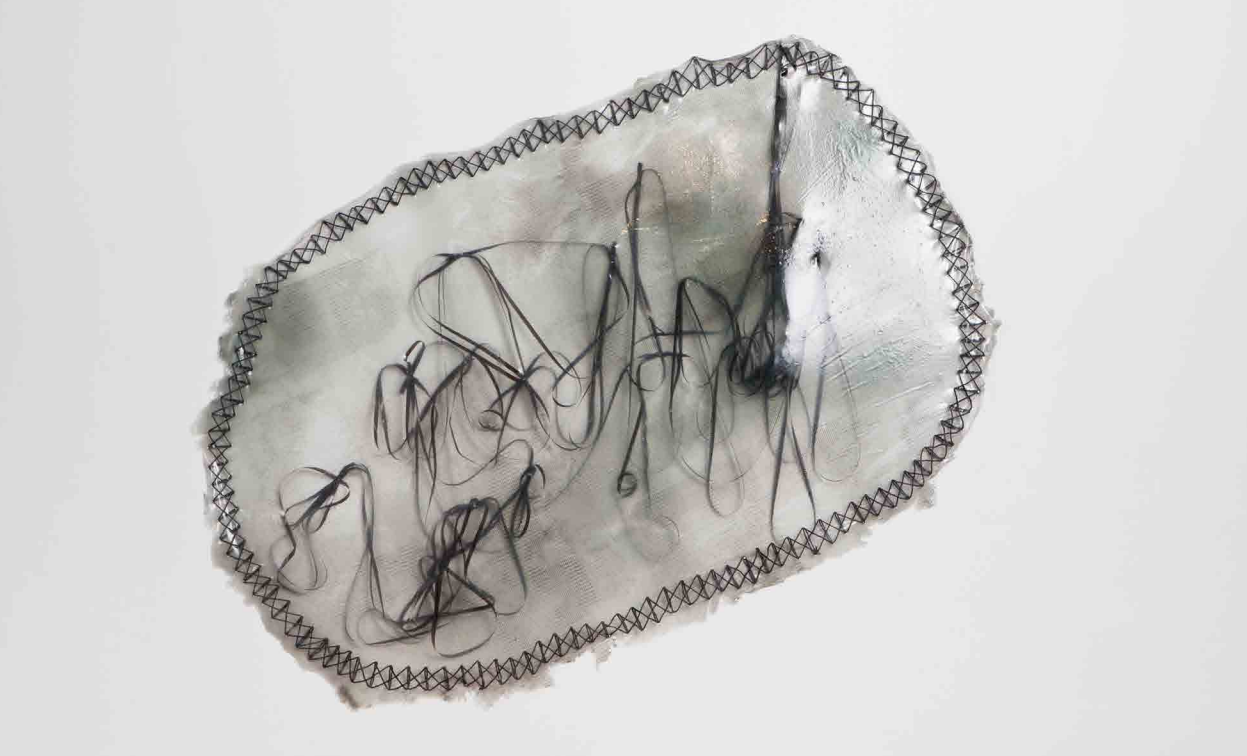

Figure 10 Kyra Devine, *Mechanical Vestige,* 2014; Screen print on PVA glue, 8mm film, twine approximately 3.5ft x 5ft, Photo credit: John Bernardo

Both *Genetic Vestige* and *Mechanical Vestige* are made from PVA that has been printed on. Before pouring out the glue slabs, I screen printed onto the drying surface. When the dried glue is peeled away, it lifts the screen printed image up with it. Faint lines of genetic code are transferred onto the surface of the PVA that make

Genetic Vestige, while correspondingly, lines of binary computer code are printed on the surface of *Mechanical Vestige.* This decision was inspired again by author Steven Johnson, from his book *Emergence*. Johnson describes the work of John Holland, who was the first person to ever receive a Ph.D. in computer science in the United States in the 1960s. Through his interest in complex, emergent behavior, and a vision to create evolving software, Holland translated Darwinian theory of evolution into computer code, and called it the "genetic algorithm" (Johnson, 57). Johnson explains that Holland's creation "revolved around a series of neat parallels between computer programs and earth's life-forms. Each depends on a master code for its existence: the zeros and ones of computer programming, and the coiled strands of DNA lurking in all of our cells" (Johnson, 58). It is amazing that as early as the 1960s, creative individuals such as John Holland were already initiating obvious relationships between our natural world and technology. By printing on the PVA used to create *Genetic Vestige* and *Mechanical Vestige,* I emphasize the connection between genetic and binary code, further comparing the evolution of species to the evolution of technology.

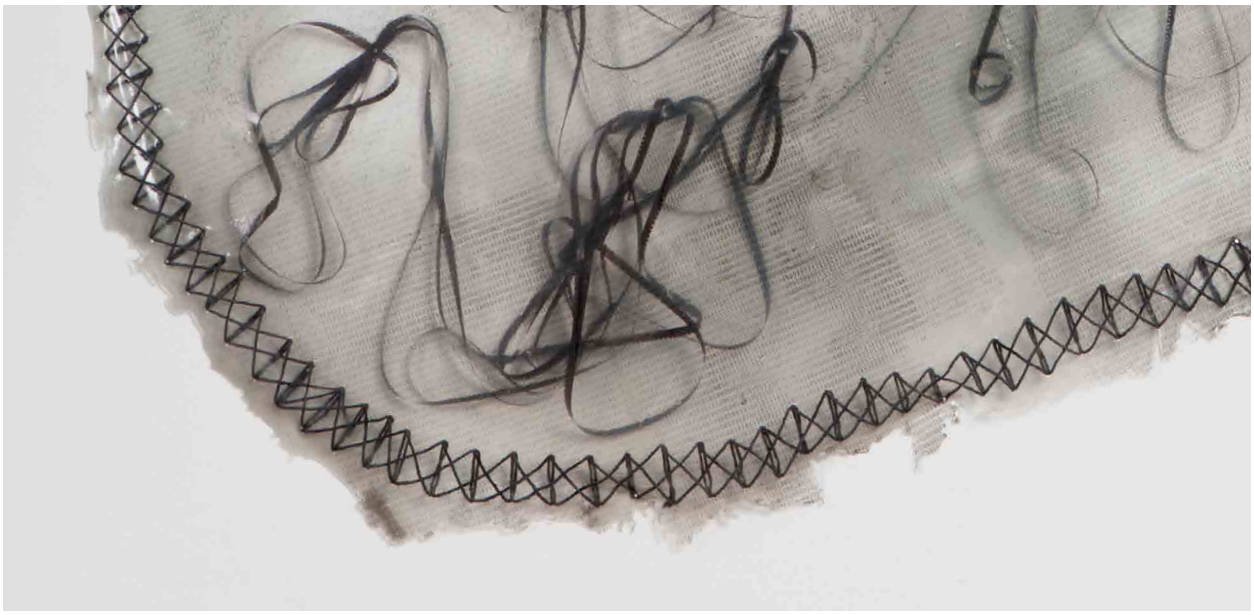

Figure 11 Kyra Devine, *Mechanical Vestige,* detail, Photo credit: John Bernardo

My process and choice of material resonates with contemporary artist Lin Tianmiao's work. Based in China, Tianmiao creates sculptural and fiber installations that critiques the relationship between Chinese tradition and modern society, including domesticity and female labor. Her work is centered on the body, often gender specific, but it largely explores how our skeletal structure universally connects human life. Although her work conceptually is quite different from my own, her artistic process is relevant to my work in that she uses materials such as bones, hair, and thread. In her recent piece *All the Same*, Tianmiao wraps bones with silk thread, completely covering them with various bright colors [figure 12]. Binding almost every bone of the human body with thread, she arranges them on the wall according to scale. A single colored thread-line falls to the floor below each bone, where the excess thread is piled. The overall effect creates a rainbow of vivid color, and this color transition conveys a progression, or a timeline. The suggests that, although humans we have evolved in distinct ways, at the core, we are indistinguishable. I am drawn to her process of wrapping bones, encapsulating remains of the past. I associate this act with my use of the caterpillar stitch: I bind bones to surfaces, suggesting that the organisms and objects in our world are bound by time—trapped in a particular point and only allowed a certain duration of existence. Tianmiao describes her choice of bone as a material, stating: "I believe that the bone is the only perfect object left in the world. Bones do not have the difference of hierarchy, culture, classes, politics, and social property between them" (Charta, 19). While Tianmiao uses bones to universally connect mankind, I use bones as physical indicators of the past. By encasing bone [figure 12], I reference physical evidence of evolution, for example, the rudimentary leg bones that still exist in whales today, a lingering vestige that describes their past transformation.

Figure 11 Lin Tianmiao, *All the Same,* 2011; Colored silk threads, synthetic skeletons, metal constructions, dimensions variable; www.galerielelong.com

Figure 12 Kyra Devine, *Genetic Vestiges*, detail, Photo credit: John Bernardo

V. *Film Medium*

During my second semester of graduate school I began experimenting with 16mm film, a material that was completely unfamiliar to me. I investigated the material by manipulating it by hand—drawing and painting on it, cutting and pasting on images, running it through a sewing machine, and screen printing onto it. Using the 8mm film in my flip book, *Darwin for President,* was the first time I physically interacted with film, unwinding the roll and digitally scanning the images from the strip. The 16mm film allowed for a larger work surface, as it is twice the size of the 8mm film strip. Although beginning as an experiment, it soon became evident that working with film as a material made sense in context to evolution. Film is a time-based medium; duration is what gives the illusion of a sequence of images moving. As film-maker Andrei Tarkovsky states, "The dominant, all-powerful factor of the film image is rhythm, expressing the course of time within the frame" (Tarkovsky). The "rhythm" of film is the accumulation of images, changing ever so slightly over a period of time. I am interested in this process in relation to evolution, as the gradually transforming, still images yield a larger, more complex series of images, which can be compared to the evolution of life.

My interest in film as a material led me to the work of Australian filmmaker Gregory Godhard, who predominately works in 16mm single-frame animation. His work is deeply influenced by filmmakers such as the Quay Brothers, and Jan Svankmajer, who share his visual aesthetic, capturing a bizarre combination of beauty and mystery in their stop-motion films. Similar to their works, Godhard's films are surreal, dream-like narratives, that lead the viewer into unexpected, imaginary situations that can be compared to jumping down the rabbit's hole in

Lewis Carroll's *Alice in Wonderland*. Although differing in stylistic approach and subject matter, there are elements throughout Godhard's work that resonate with my practice. In his film *Museum of Dreams*, creature-like forms crawl in and out of the frames, random drawers filled with bones or mysterious organic life open and close in a room, a character stands in an ambiguous space made entirely of fur [figure 9]. Although not specifically concerned with evolution, Godhard is fascinated by time, for example, multiple films depict time moving backwards, the hands of a clock spinning the opposite direction, or sand from an hourglass floating back up into the top half. I am attracted to these elements in his work, as well as to his creative use of natural specimens and organic materials as props. The specific atmosphere Godhard produces motivated my own film practice, and exposure to his work encouraged my experimentation in this unfamiliar medium.

Figure 13 Gregory Godhard, *Museum of Dreams* (still), 8min. 16mm film, 2003; www.youtube.com/watch?v=gdSA7AqlUJ4

My two-part short film titled *Sorting Algorithm* and *Life Emerging* was also inspired by the writing of Stuart Kauffman, an American theoretical biologist and complex systems researcher whose writing primarily focuses on the origin of life on Earth.

Studying the complexity of biological systems and organisms, he argues that in addition to the Darwinian theory of natural selection, such life may evolve from self-organization and far-from-equilibrium dynamics (Lifeboat). In his book *At Home in the Universe*, Kauffman beautifully describes the emergence of life, and the spontaneous order that occurs in nature, all while teetering on the edge of chaos. Kauffman explains the nature of spontaneous order, stating that "complexity itself triggers self-organization...If enough different molecules pass a certain threshold of complexity, they begin to self-organize into a new entity—for instance, a living cell" (Oxford University Press).

I am most drawn to the comparison Kauffman makes between the evolution and organization of life on Earth and computable algorithms. An algorithm is defined as a set of procedures that generate the answer to a problem, for example, the quadratic equation used in algebra. Algorithms take the shortest route in solving a problem, making them incompressible (Kauffman, 466). Because the compressed algorithm is taking the shortest route possible, the solution is revealed in the most efficient way. Any predictions as to the result of the algorithm can only be made while watching it unfold. Kauffman explains in his comparison that it is impossible to have any concise theory about the origin and evolution of life, that "we must instead simply stand back and watch the pageant" (Kauffman, 463). I am interested in the connection Kauffman forms between his evolutionary theory and a concept taken from the field of computer science. He expands on this metaphor, eventually referencing more specifically sorting algorithms. Knowing that our universe is vast, wondrous, and complex, the idea that it is self-organizing—sorting itself out like a giant arithmetic problem, gradually adjusting and arranging through genetic mutations, is something I

find beautiful and an inspiration to my art practice. Kauffman's analogy of comparing the evolution of the universe with a sorting algorithm reinforces the connections I see between the natural world and our advancing technologies, and portrays a compelling scenario where they perfectly coexist.

Sorting Algorithm (2:11min) and *Life Emerging* (4:53min) are two separate short films, displayed alongside each other, created from 16mm film and iPhone footage [figure 14]. To make *Sorting Algorithm,* I appropriated an animation that is used as an aid in computer science classes to help one visualize how different algorithms sort information. I captured the digitally animated sorting algorithms with a 16mm camera. The. Unless educated on the subject of computer science, the visualization of the sorting algorithms looks quite abstract, a succession of lines, rearranging themselves on the screen. Although the untrained person may not identify these images with computer science, or even algorithms, the images do imply, more generally, a chaotic state gradually being organized. For example, the image may start out black with dozens of tiny white lines running vertically across the screen. The tiny white lines are then slowly and systematically grouped together to create larger white lines, the end product yielding one large, white line. This is just one example of the several organization methods of sorting algorithms featured in the film.

Life Emerging is played directly next to the sorting algorithm footage, and was filmed using both a 16mm camera and an iPhone video camera. Considering Kauffman's theory of emergence and the gradual reshaping of chaos into complex order, I filmed my own examples of "life" emerging by capturing images that suggest a big bang,

and rudimentary creatures struggling to progress. Materials and objects that I use in other works in my thesis exhibition also appear in my film, for example, PVA surfaces, that are sometimes printed on, slide around like shifting plates of the Earth's surface. I also use my sculptural objects as props, and sometimes natural physical objects, such as animal bones or skin, to create background surfaces throughout the film.

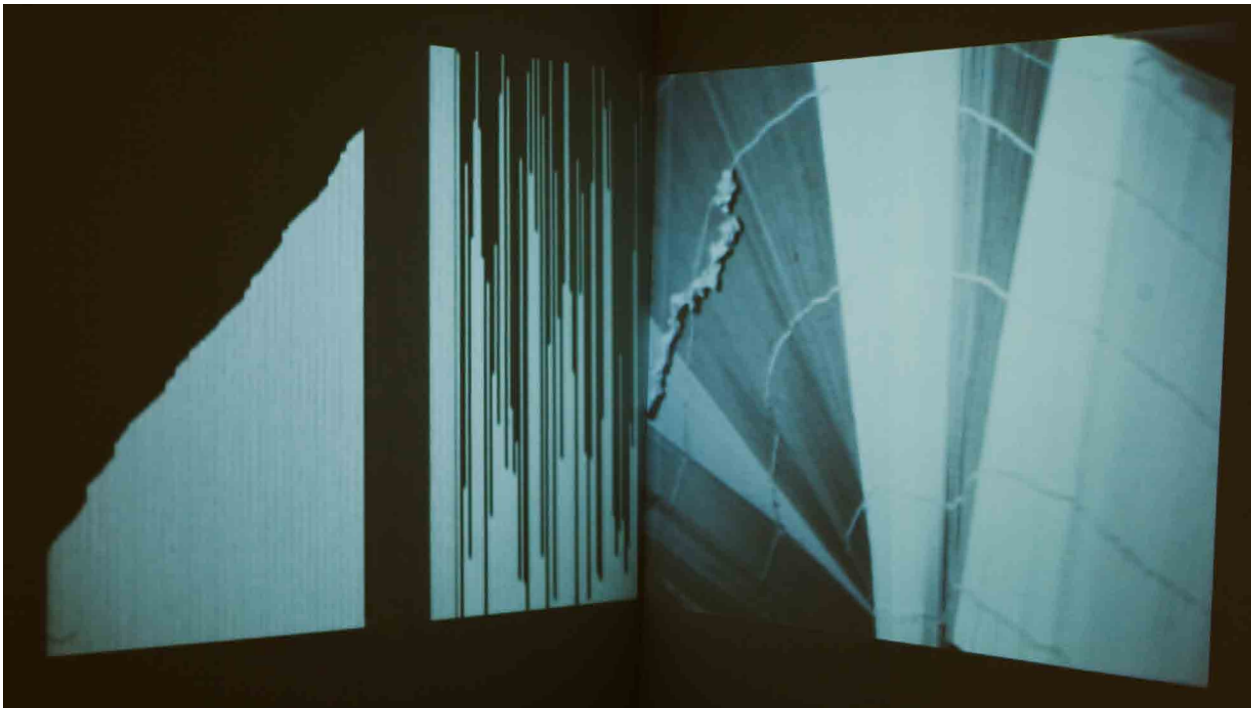

Figure 14 Kyra Devine, *Sorting Algorithms* (left) 2:11min, *Life Emerging* (right) 4:53min, 2014; 16mm film and iPhone video, Photo credit: John Bernardo

The film revolves around time (the sorting algorithm) and the way in which it molds and transforms living things, organizing and gradually allowing the fictional creatures on the screen to evolve and increase in complexity. The caterpillar stitch appears in the film, again suggesting a timeline. The stitched line moves in and out of the frame, crawling over objects or binding bones to surfaces [figure 15], constraining them to a particular point within its line. Similar to its role in my other works, the stitch exerts control—encapsulating objects or forcing them to remain in place.

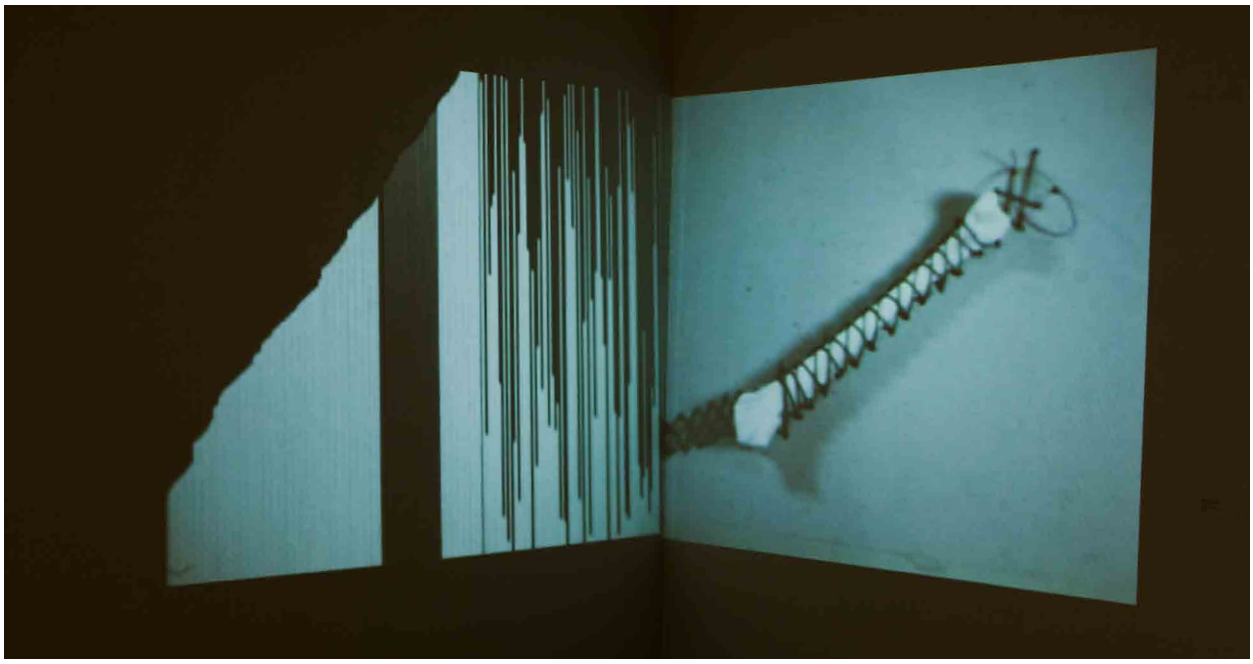

Figure 15 Kyra Devine, *Sorting Algorithms* (left) 2:11min, *Life Emerging* (right) 4:53min, 2014; 16mm film and iPhone video, Photo credit: John Bernardo

While I film images of the caterpillar stitch, I also literally sew onto the 16mm film strip, creating the illusion of a stitch running quickly up the screen. In other scenes, stitching is captured by 16mm single frame shots (stop animation), giving it a more rough look, as if crawling slowly, investigating the surface. Changing the rate at which the "timeline" moves on the screen references different eras in our Earth's history, periods of life evolving quickly, like the Cambrian Explosion, followed by mass extinctions. Translating the caterpillar stitch to film media brings my timeline metaphor to life, allowing me to literally move it forward, backward, up and down the screen.

30

Drawing on emergence theory and the organization of species, I explore the evolution of the eye in *Life Emerging*. Parts of the film are shot using 16mm film, and other parts are captured with an iPhone. By working with these contrasting mediums, I reference the development of image quality in our lensed-based media,

while suggesting the physical transformation that our technology has undergone. Capturing images with the Bolex (16mm movie camera) is a completely different experience from digitally recording something on an iPhone. There is no immediate visual recording in this aged technology; the images captured on the film remain a temporary mystery, suspended inside of the camera until chemically processed. There is no guarantee that an image will appear as expected, and if it does, there is often fuzz or dust interference. I welcome these characteristics, as they are evidence of process and express the tactility of film. The Bolex camera is also extremely heavy compared to the iPhone. While our new technology captures crisp images, comfortably from the palm of our hand, filming demands physical interaction: a tripod holds the camera while the lens focus and aperture are constantly adjusted, and after every 15ft of film is shot, the camera must be manually wound before shooting again. The physical nature of the Bolex contrasts with the iPhone, which is so perfectly designed to be held in one's hand, resembling an appendage, and can continue filming almost indefinitely. Choosing to work with a 16mm camera and an iPhone speaks to the transformation of our technology, while allowing me to express ideas of evolution and duration in my films.

VI. Conclusion

My thesis exhibition *Shaped in Time*, explores the subject of evolution and duration in a variety of mediums, including printmaking, bookbinding, stitching, sculpture, and film. The conceptual basis of my work largely draws on examples of evolution found in nature, and evolutionary theories discussed by scientific authors and/or philosophers, such as Henri Bergson, Steven Johnson, and Stuart Kauffman.

Investigating this subject over the past two years of my MFA graduate program has allowed me to develop my artistic practice in new and unexpected ways, as well as define myself within a contemporary art context, considering how my practice relates to visual artists Patricia Piccinini, Lin Tianmiao, and Gregory Godhard. This thesis study has been a significant aid in the expansion of my art-making process and the development of my career as a visual artist.

My graduate thesis work reflects on evolution and duration through examples of vestigiality in nature, the natural defense mechanisms of species, our biological and mechanical tools, and biomimicry—our reliance on nature to aid in the construction of our technology. Using my fascination with the relationship between the natural and the synthetic, I consider how our tools have evolved over time.

Exploring new processes and unfamiliar materials has transformed my studio practice. As my work conceptually developed during the program, exposure to new mediums allowed me to identify processes and materials that most appropriately fit the content of my work. Investigating materials and considering their properties, for instance, whether natural or synthetic, has revealed ways in which material can visually speak to the topic of evolution.

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Winter, Lisa."Engineers develop "e-whiskers" that could give robots the ability to "see" and "feel" their environment." *IFLS*. Technology. 22 Jan. 2014. Web. 12 Feb. 2014.

Image Citation:

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KYRA DEVINE

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Rib Cage, Cold and Warm, 2013

EDUCATION

2014

MFA, The University of the Arts, Book Arts / Printmaking,

2010

BFA, Texas State University, Double Major, Studio Art–Printmaking and Communication Design

Minor in Mass Communications

PROFESSIONAL EXPERIENCE

2014

Book Conservation Intern, The Library Company of Philadelphia, Philadelphia, PA

Conservation Assistant, The Greenfield Library, University of the Arts, Philadelphia, PA

2013

Book Conservation Intern, Historical Society of Pennsylvania, Philadelphia, PA

Teaching Assistant, Instructor Francis Osugi, *Bookbinding Methods*, The University of the Arts

Book Conservation Intern, The American Philosophical Society, Philadelphia, PA

Teaching Assistant, Instructor Amanda Benton, *Introduction to Photoshop*

Continuing Education at The University of the Arts

Teaching Assistant, Instructor Rebecca Gilbert, *Relief and Monoprinting*, The University of the Arts

Teaching Assistant, Instructor Marisha Simmons, *Introduction to Screen Printing*, The University of the Arts

2011/2012

Cooperative member at Burning Bones Press, Houston, TX

Workhorse Printmakers, letterpress printing assistant, Houston, TX

2011

Artist In residence at TRANSIT: A Cooperative for Artists in Transition, San Antonio, TX

Temporary instructor, nine week Prehistoric–Roman Art History St. Michael's Episcopal School (High School), Bryan, TX

Guest Lecturer at Texas A&M University, Dept. of Visual Arts, a discussion on the combination of screen printing and poster desgin, College Station, TX

2009

Coronado Studio Internship, Assisted Master Printer and Studio Manager with fine art serigraphy projects, Austin, TX

EXHIBITIONS

2014

Shaped in Time (Solo Exhibition), MFA Thesis Exhibition, Rosenwald-Wolf Gallery, Philadelphia, PA

Lost Then Found - The Wunderkammer, Gallery 1010, University of Tennessee, Knoxville, TN

*Flatbed Contemporary Art Fair (*Print Austin), Flatbed Press, Austin, TX

Here & There: A Postcard Exchange, Sixth Floor Gallery, the University of the Arts, Philadelphia, PA

Skin and Bone, Historical Book Structures and Handmade Tools, Anderson Hall, the University of the Arts, Philadelphia, PA

2013

Works in Progress: Exploring Origins and Identity, Gallery 224, the University of the Arts, Philadelphia, PA

Really Big Print Show, Cheltenham Center for the Arts, Cheltenham, PA, Juror: Ingrid Schaffner
(Awarded First Prize)

Works in Perception X3, Gallery 224, the University of the Arts, Philadelphia, PA

Tawney Continues, Gallery 224, the University of the Arts, Philadelphia, PA

Burning Bones Print Artist Show, Avis Gallery, Houston, TX, Juror: Carrie Hardaker

Polydactyl: An Exhibition of Prints, Caroline Collective Gallery, Houston, TX

2012

Steamrolled II: Wonderland, Gallery M2, exhibition of steamrolled woodcuts, Houston, TX

Rock and Roll Steamroller Event, participant, St. Arnold's Brewery, Houston, TX

IT CAME FROM THE BAYOU, participant with Workhorse Printmakers, Continental Club, Houston, TX

Luminaria: Arts Night In San Antonio, selected artist, San Antonio, TX, Juror: Dean Daderko

2011

The Transforming Man No. 3: The Killer, the Cow, and the Poison Cliffs (Solo Exhibition), TRANSIT: A Cooperative for Artists, San Antonio, TX, Juror: Gabriela Santiago, Jeremiah Teutsch, and Libby Morris

CTRL+ALT+CREATE, Heights Theater, AIGA Houston/Workhorse Printmakers, Houston, TX

Artist of the Month (Solo Exhibition), 979 Gallery, Bryan, TX, Juror: Kristy Petty

Equilibrium/Disequilibrium, SGC International Conference Member Portfolio Exchange, St. Louis, MO, Juror: Elizabeth Wyckoff

2010

Smoke and Mirrors, Plain Brown Wrapper: National Undergraduate Print Portfolio Biennial Competition, University of North Dakota, Juror: Majorie Devon

Art Step, The Frame Gallery, Bryan, TX, Juror: Greta Watkins

All-Student Juried Exhibition, School of Art and Design Galleries I & II, Texas State University, San Marcos, TX, Juror: Risa Puelo

2009

Fine Art Student Association Exhibition, Pump Project Gallery, Austin, TX, Juror: Virginia Fleck

Artworks in the Community, Walker's Gallery, San Marcos, TX, Juror: Linda Kelsey-Jones

All-Student Juried Exhibition, School of Art and Design Galleries I & II, Texas State University, San Marcos, TX, Juror: Riley Robinson

PUBLICATIONS

2013

Montgomery Media, "Artists hit the 'Big' time at Cheltenham Center for the Arts"

By Tara Lynn Johnson

2012

Graphis Magazine, Creative Summit 25 Ralph Award Winners

2011

The San Antonio Current, Critic's Pick, Issue November 30–December 6, 2011

The Dogrun, LakelFlato Architect's Online Community

AWARDS

2014

Lenore Adelman Award for Book Arts, the University of the Arts

College of Art, Media, and Design Special Award: Library Purchase Award (Greenfield Library), the University of the Arts

2011

Resident Artist at TRANSIT: A Cooperation for Artists in Transition, San Antonio, TX

Coveted Memorial Ralph Award, Creative Summit 25

Certificate of Excellence, Creative Summit 25

2010

Awarded Dean's Council of Scholars, College of Fine Arts and Communication, Texas State University

Golden Key International Honour Society, Texas State University

Phi Eta Sigma National Honor Society, Texas State University

KYRA DEVINE | Artist Statement

Drawing from the subject of evolution, *Shaped in Time* celebrates evidence of duration found in the organisms and objects of our world. The work revolves around physical connections that link the present with a past time—proof of origin, and clues of a previous existence.

I am interested in how the accumulation of time has the ability to mold and shape, allowing for the reconstruction of the simple into complex. We cannot escape the natural order in which time organizes and transforms. In this way, time binds us, constraining our existence to a specific length and location within its line.

Our modern tools are often designed in response to biological functions or systems in nature. My interest in this biomimicry led me to explore the visual relationship of natural and synthetic material in my work. When combining materials such as plastic or latex with bones, claws, or leather skins, I contemplate how these materials interact with each other, and how the organic tools of our body fuse with the man-made material with which we constantly surround ourselves.

"Duration means invention, the creation of forms, the continual elaboration of the absolutely new." -Henri Bergson*, Creative Evolution*

KYRA DEVINE | Image List

01_***Accumulation***

coptic bound book and PVA on plaster,
approximately 11ft x 20in-2in, 2014

02_***Accumulation***, detail

03_***Fossil Cells***

various sewings, dyed and printed paper,
approximately 3.5ft x 2in, 2013

04_***Fossil Cells***, detail

05_***Genetic Vestige***,

six units, Screen print on PVA glue, thread, bone, teeth, eggshells, artificial fish eyes, each approximately 4in x 3in, 2014

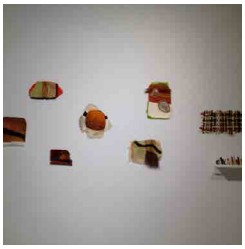
06_***Genetic Vestige,*** detail

07_***Mechanical Vestige***

screen print on PVA glue, 8mm film, twine approximately 3.5ft x 5ft, 2014

08_ ***Mechanical Vestige***, detail

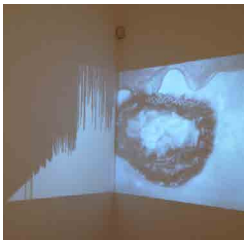
09_ ***Natural vs. Synthetic***



PVA glue, artificial hair and eyelashes, vellum, cat claws, various sizes, 2014

10_ ***Natural vs. Synthetic, detail***

11_ ***Sorting Algorithm* 2:11min (left), *Life Emerging* 4:53min (right)_still**



16mm film and iPhone video, 2014

12_***Headbands***

leather and hemp cords, thread, dye,
artificial eyelashes, each approximately 3in x .25in
2014

13_***Headbands***, detail

14_***Time's Line Envelops All***

rock, thread
5in x 5.5in x 4.5in, 2013

15_***Time's Line Envelops All***, detail

16_***The Hidden Gene That Lingers In Birds***

glue, acrylic paint, alligator teeth, thread
each approximately 4in x 3in, 2013

17_***The Hidden Gene That Lingers In Birds***, detail

18_***Rib Cage, Cold and Warm***

glue, snake ribs, bird ribs

8in X 12in, 2013

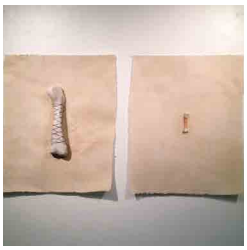
19_***Rib Cage, Cold and Warm***, detail

20_ ***Hip Transformation: Saurischian Dinosaur to Modern Day Bird***

drypoint on glue
18in X 22in, 2013

21_ ***Hip Transformation: Saurischian Dinosaur to Modern Day Bird, detail***

22_ ***Remnants Remain, Bound to a Particular Point***



paper cast of alligator leg bone and bird leg bone, thread, 16in X 20in (each), 2013

23_ ***Remnants Remain, Bound to a Particular Point , detail***

01_***Accumulation***

02_***Accumulation***, detail

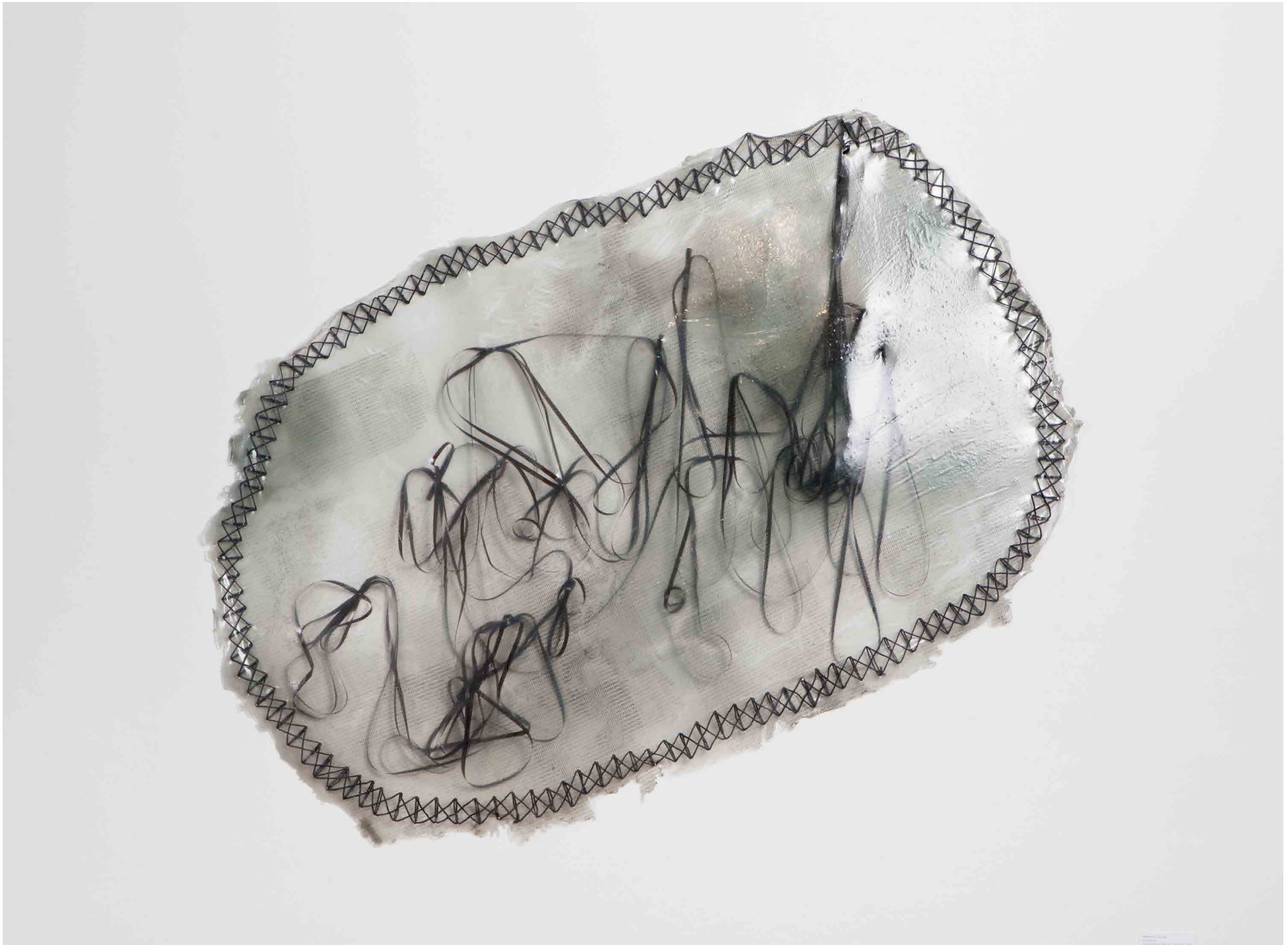
03_***Fossil Cells***

04_***Fossil Cells***, detail

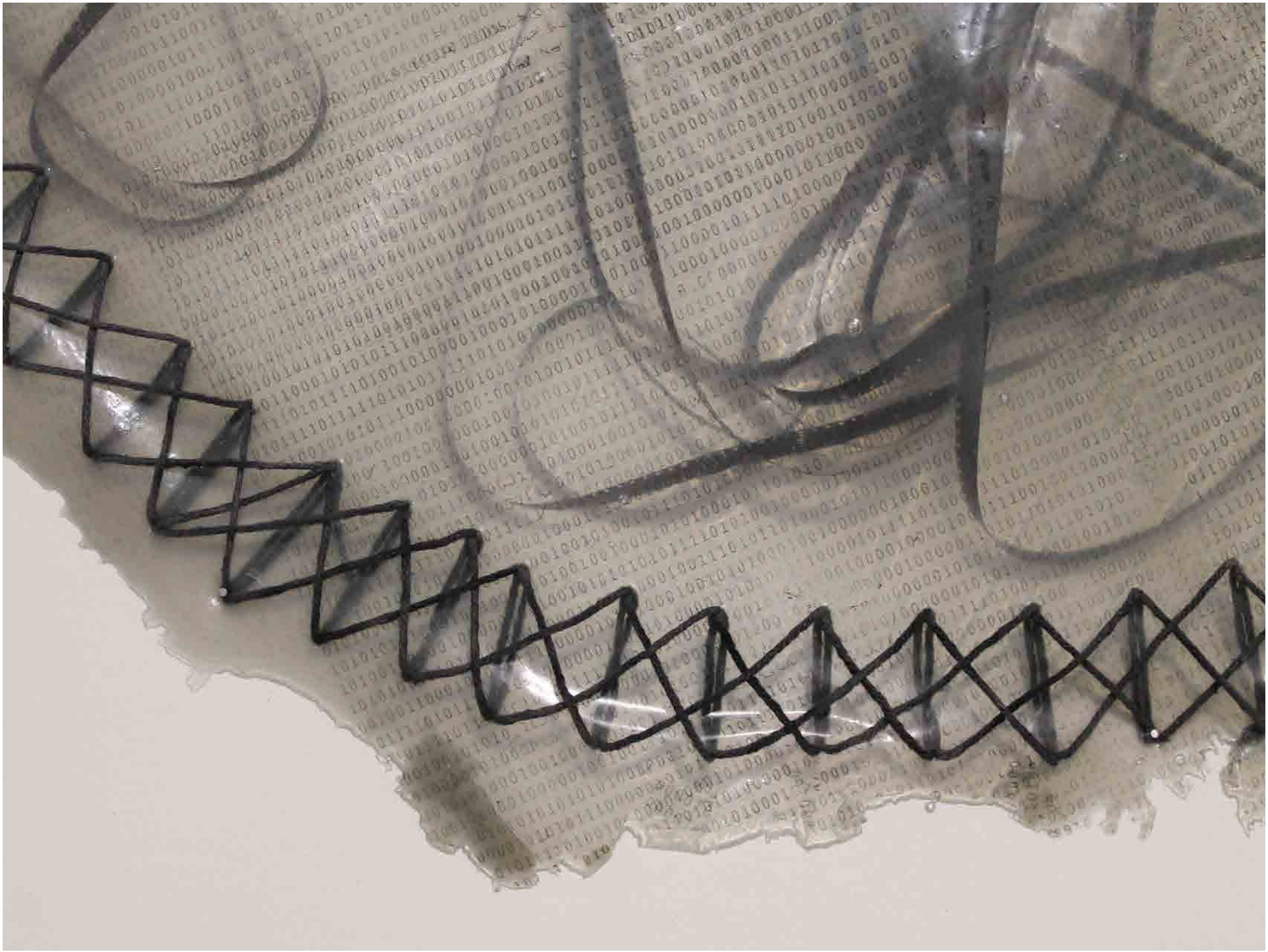
05_***Genetic Vestige***

06_***Genetic Vestige,*** detail

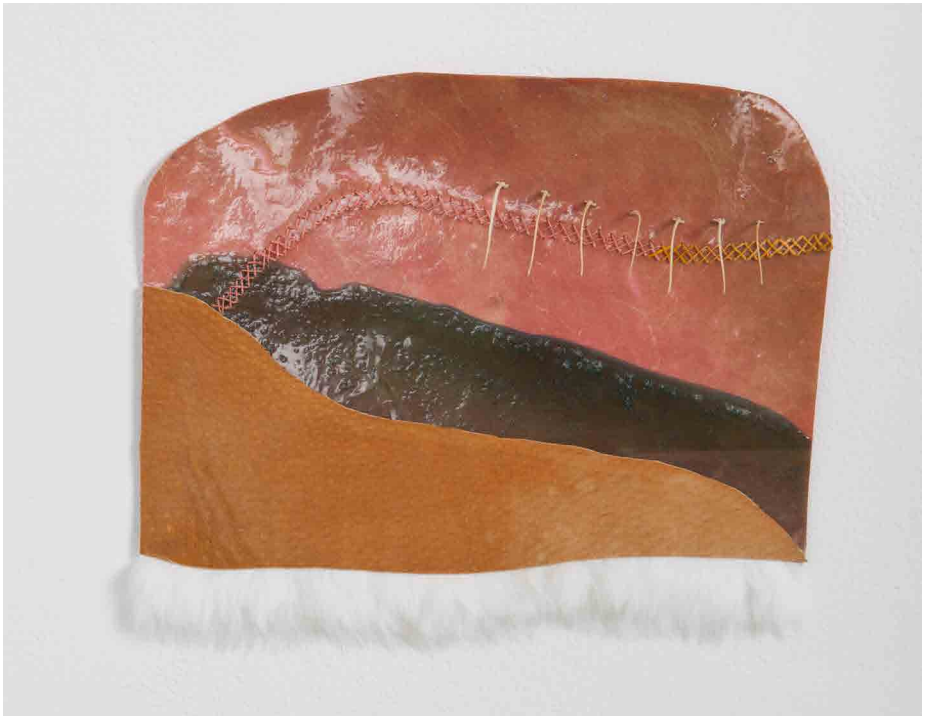
07_***Mechanical Vestige***



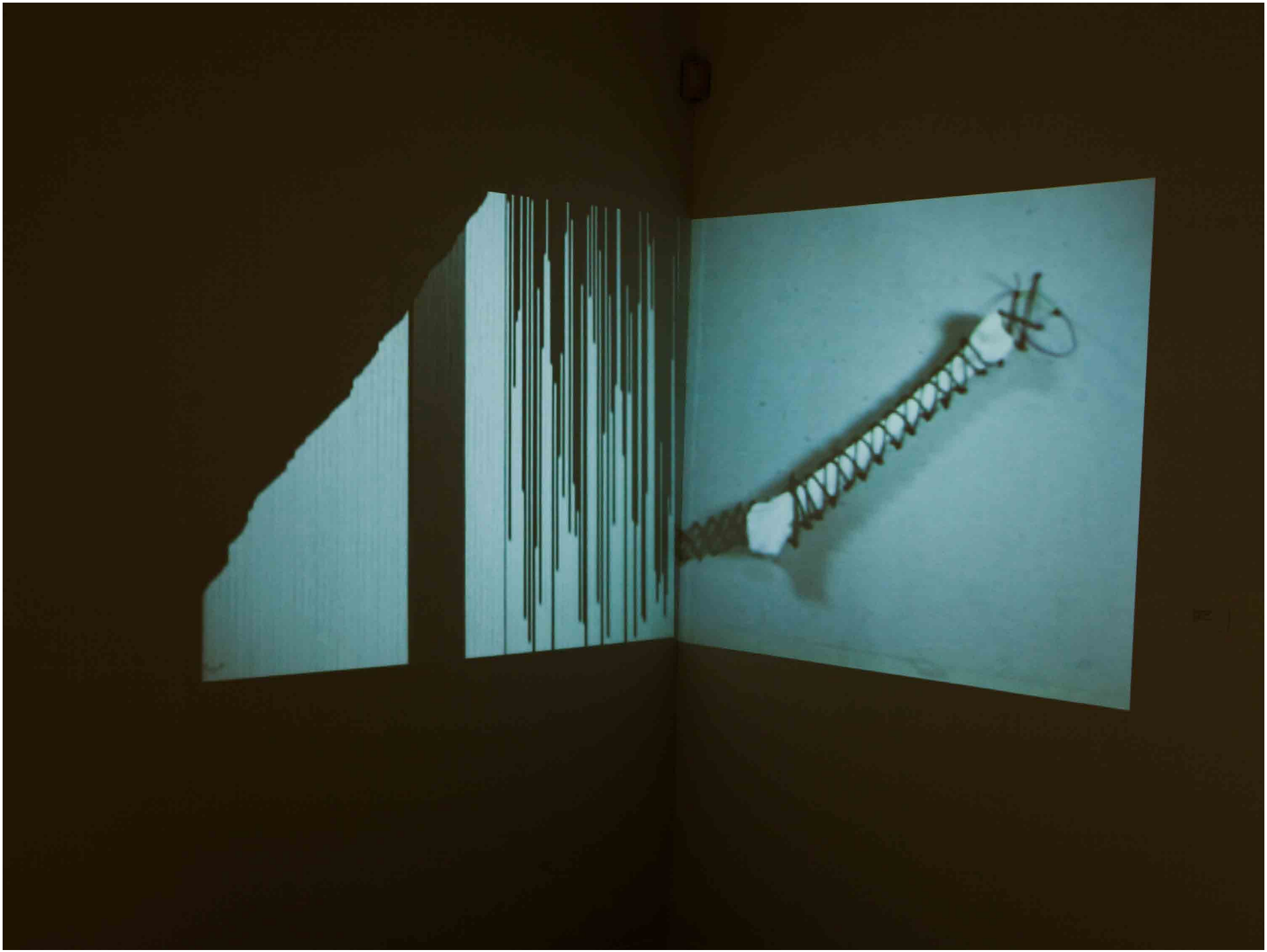
08_ ***Mechanical Vestige***, detail



10_ ***Natural vs. Synthetic, detail***



11_ ***Sorting Algorithm*** **2:11min (left),** ***Life Emerging*** **4:53min (right)_still**



13_***Headbands***, detail

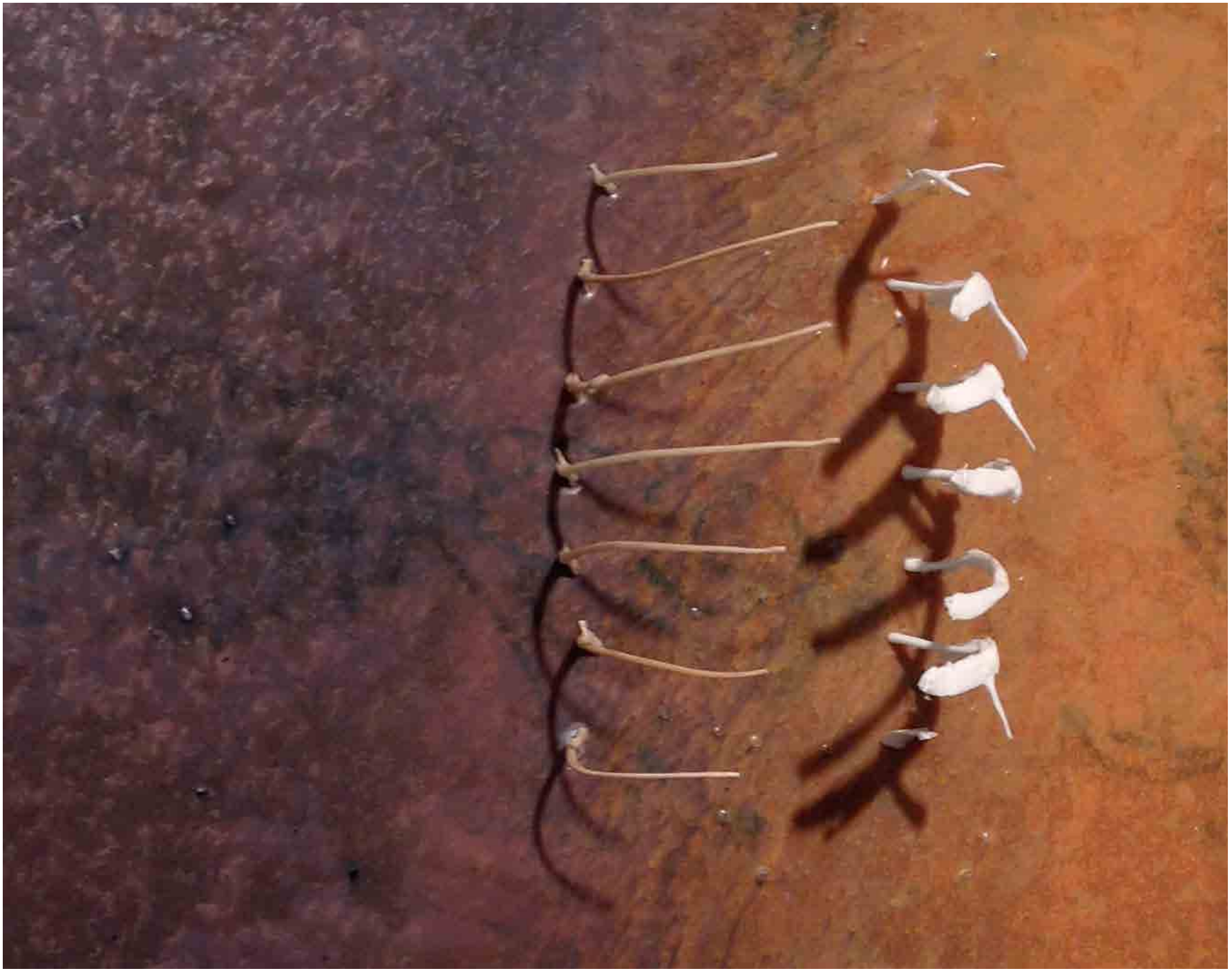
14_***Time's Line Envelops All***

15_***Time's Line Envelops All***, detail

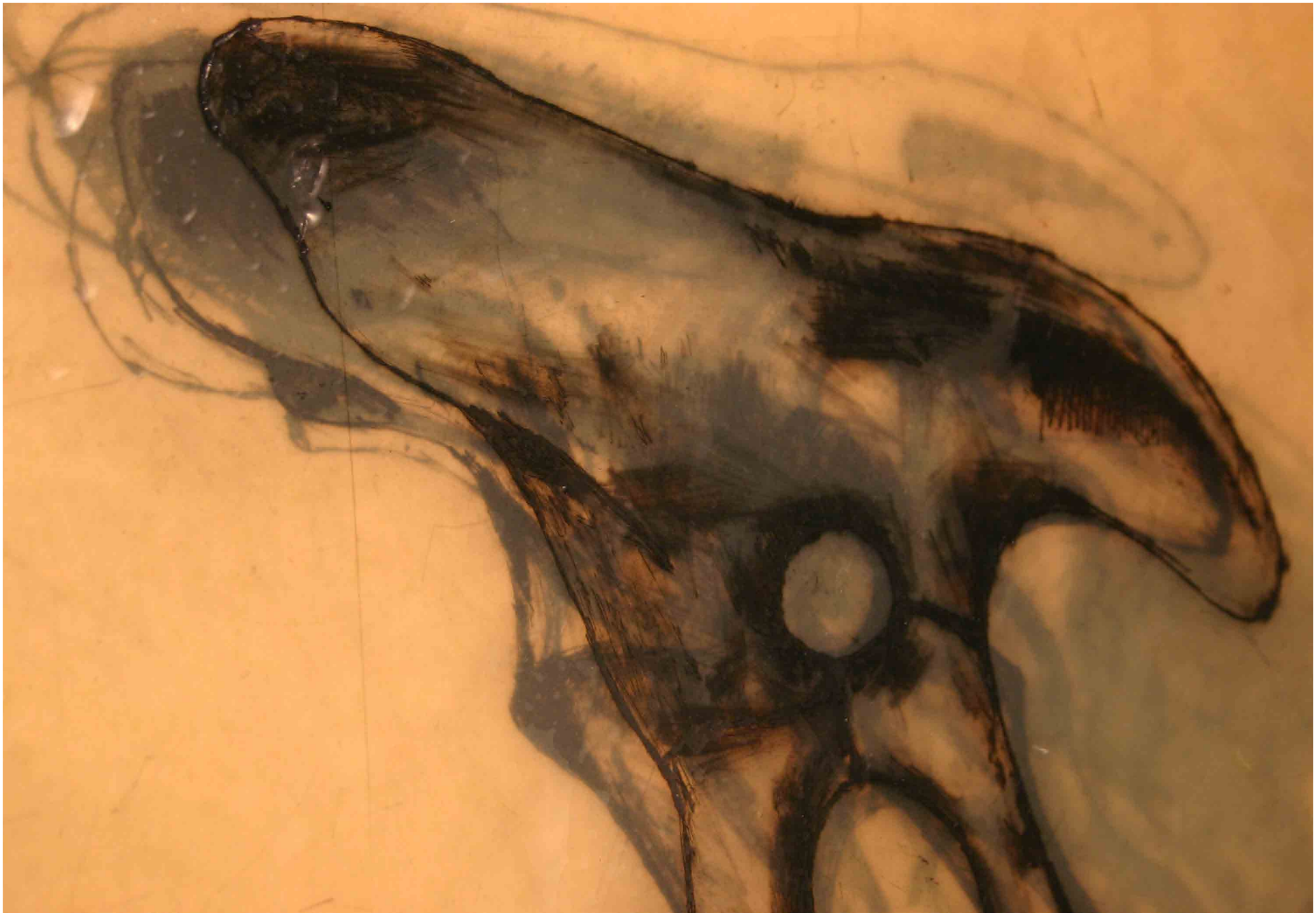
16_***The Hidden Gene That Lingers In Birds***

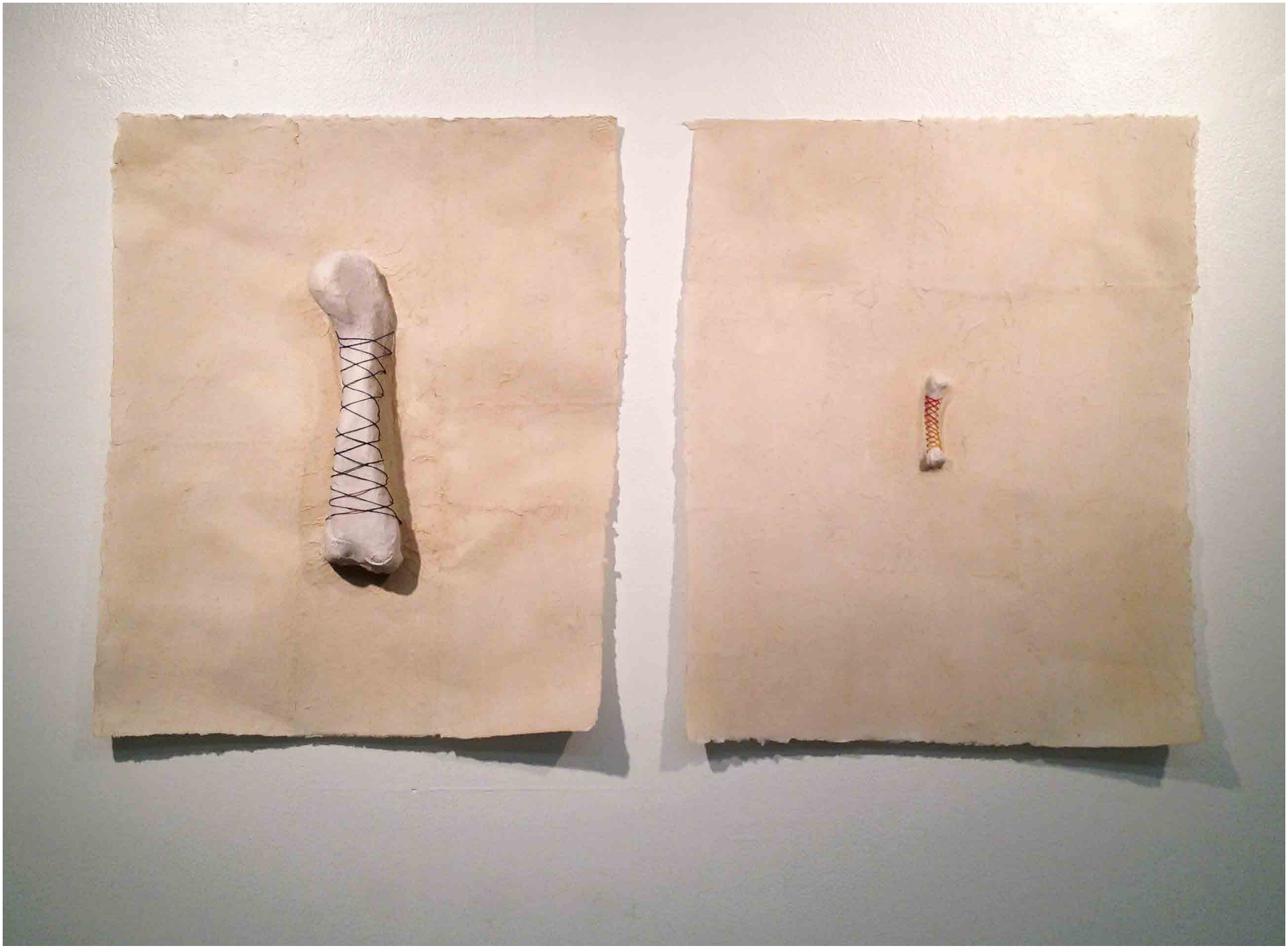
17_***The Hidden Gene That Lingers In Birds***, detail

18_***Rib Cage, Cold and Warm***



21_ ***Hip Transformation: Saurischian Dinosaur to Modern Day Bird, detail***





23_ ***Remnants Remain, Bound to a Particular Point , detail***