Growth Patterns

by

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The presence of formulaic growth patterns such as fractals and the divine proportion in the botanical, animal and physical landscape inspire and intrigue me. Fractals are characterized by self-similarity, in which the whole form has roughly the same shape as the repeated smaller parts. The divine proportion is characterized by saying the whole is to the larger in exactly the same proportion as the larger is to the smaller. These two principles describe how forms in nature progress and grow in mathematical ways. In the natural world these principles can be seen in the way an onion grows in successive rings, how a bird's wing has large feathers that proportionately get smaller, and the way a wave materializes in the ocean. Using invention, imagination, and emulation with these organic design principles, I generate my own language of wearable and sculptural objects. My conscious choice of materials is a decision to have a low environmental impact, paying homage to my organic influences.

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Masters of Fine Arts

by

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Dedication

To my dad, who encouraged me to continue my education, and who was supportive in my art making along with all of my endeavors.

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Introduction

“Everything comes out of the great book of nature.” Antonio Gaud”

Beginning with outdoor play as a child, my imagination and aesthetic have evolved into abstracting forms and patterns from the natural world to make objects and wearables. This is far from an original idea; many art forms are based around natural imitation and imagery. To name a few, the tattoos of the Samoans (fig. 1), the patterned decorations of Morocco (fig. 2), and Neogothic architecture (fig. 3). Along with imitating nature, these art forms speak of patterns composed of lines in the same way my work is patterns composed of wire. Working in 3-dimensional space the patterns interaction with the surface of the object changes them and in some cases the patterns create them.

Figure 1: Traditional Samoan Pe’a

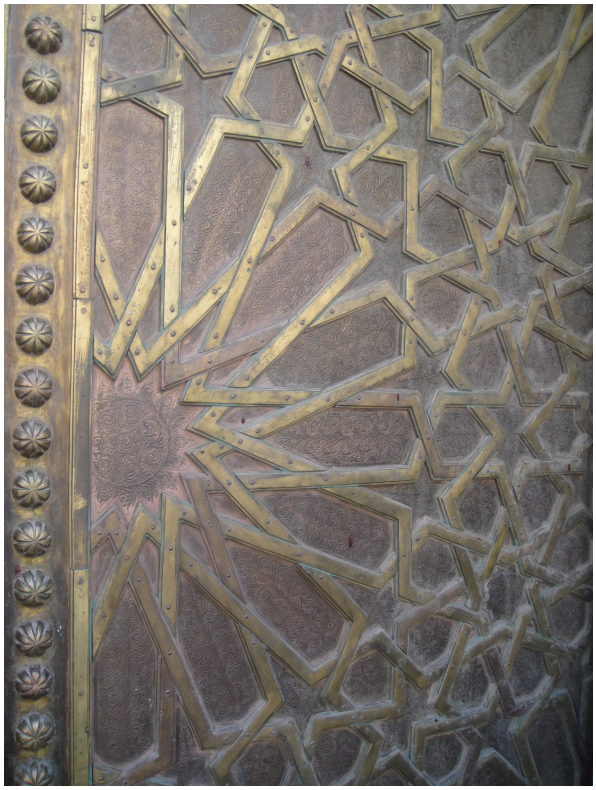

Figure 2: Pattern on Moroccan door

Figure 3: The ceiling of the Sagrada Familia, a Neogothic church designed by Antonio Gaudi in Barcelona, Spain

Through introspection and conversation, I have discovered recurring formats that emerge from my work. These formats are: my methods of idea generation through play, the archetypal shapes I use, using line to create space and form, and my choice to use environmentally friendly materials. The interconnection of these ideas and their underlying relationship to my infatuation with the natural world is explored.

CHAPTER 1: Play and Imagination

As a child I loved to be among the trees and playing in the creek behind our house. There was so much mystery and discovery to be had there. One of my first memories is waking up before my family and being downstairs by myself gazing out the back window into the forest. This particular morning was blustery and the trees were very animated waving about wildly. Suddenly I heard a low *boom*, followed closely by another. Carefully scanning the forest to find what was making this sound, I saw it. It was the trees. They were walking! Could they see me? Were they coming for me?! Quickly I pulled the curtain and dove behind the couch. After a while I decided that they must have been traveling in the opposite direction from my house, nevertheless I was in terror till my parents awoke. For a time after that I watched trees carefully to make sure they weren't walking. Soon, through this observation, I learned trees are rooted and they can't walk. This has become a fond childhood memory but also an example of using imagination as a tool for discovery and inquiry into my surroundings. In *Deep Play,* Diane Ackerman relates the important role that play has with learning in animals, "The more an animal needs to learn in order to survive, the more it needs to play" (Ackerman, 4). As I grew, significant learning occurred while playing outside in the woods and creek around my home. These first forays into discovery and knowledge through the natural world have been very influential within my life and consequently, with the objects I make.

In my eyes, play and imagination make things that are improbable possible. Play is defined as amusing oneself by engaging in imaginative pretense. The two activities are decidedly linked through imagination being a specific type of play. Imagination is

defined as “the faculty or action of forming new ideas, images or concepts of external objects not present to the senses or, the ability of the mind to be creative or resourceful” (Merriam-Webster). Developing an active imagination early on has been important for my work. When beginning with a loose idea, I have to imagine what I want to make. What is it to be made from, what shape will it be, where does it go on the body? What kind of feeling does it have about it? Is it mysterious, intimate, exciting, or a combination of many feelings? Once I have a vision, then the making begins. When difficulties arise I use play to problem solve and imagination to change my vision of the work. Through play I think with my hands and let each new idea and possibility form in front of me.

In a predictable evolution, nature has transitioned from my physical arena of play to my mental arena. I use memories of my experiences in the wild to inspire imagination and ideas in my work.

CHAPTER 2: Formal Imagery

Lars Spuybroek discusses the decoration of the man made world in patterns and textures as if they have been grown instead of being arbitrary:

> The question is not whether we need to 'return' to ornament, because that would implicitly historicize the issue, but we do need ornament, more than ever; now that we are just naked beings between naked buildings and objects, we need to drape ourselves and our things *as if they have been grown*, drape them as if they are textured, as if they are encrusted (89).

My jewelry is ornamental. I construct it as if it has been grown using pattern as the blueprint and the formal imagery is inspired from nature.

Walking along the tree line at dusk, I noticed glowing green orbs were floating all throughout one tree. I had no idea what the green orbs were made of but they filled me with wonder. It looked as if someone had decorated the tree to prepare the forest for festivities. This was my magical introduction to the Hedge-apple tree that still lingers in my mind. It is native to prairie lands and known for it's large bright yellow green fruits (fig.4). Even when seeing them today, the feeling of that first sighting always floods back.

Figure 4: Hedge-apple

Archetypal Forms

The image of the Hedge-apple has subconsciously stayed with me and come to represent a moment of pure excitement and astonishment I felt with the natural world. The

feeling was that anything could be possible, especially in the natural realm. Things outside of my knowledge and comprehension could be real. The green orbs started popping up in my drawings, paintings, and then in my 3-D work. With the repetition of its appearance I realized how symbolic this form was to me personally. I use a number of forms in my work that are archetypical images from which I pattern similar forms. The Hedge-apple form is one of these as evident in the work *Rain Badge* (fig.5). The top form is a translation of the shape and color of the Hedge-apple and the negative spaces imitate the repeated shapes that make up the form itself. Crescents also appear repeatedly in my work.

Figure 5: *Rain Badge*

Associated with the moon, this shape morphs and changes as the phases of the moon cycle and time pass. I use this shape as an overarching form and as a building block for larger forms as in *Swirl brooch* (fig. 6). Teardrop shapes appear throughout my work as well, in form and in the patterns that make up the overall figures as in my *Tri-Tear Drop brooch* (fig. 7). For me this shape stands for water and its continuous cycle around the earth. Pod and plant inspired forms (e.g. the Hedge-apple) also appear in my work, these archetypal forms are everywhere around me in the natural world and symbolize growth, new beginnings, and transformation as in *Burgeoning* in (fig. 8). Beyond their natural origins the common theme among all of these forms is that they represent cycles and patterns of life.

Figure 6: Swirl brooch

Figure 7: *Tri-Tear Drop*

Figure 8: *Burgeoning*

Line to Space to Form

Line is an important factor in my work. I use it to draw, define space and ultimately to create form. Lines, or steel wire, act as a delineator and creator of space. The interstices combine with the wire to create an overall form, one created from an ornamental structure. The patterns generated by the movements of the line at once create and decorate the structures. These forms are ambiguous, they have a greater volume than they do mass, and the foreground and background of the forms are hard to pinpoint. The way the repetitive lines and interstices successively enlarge or decrease depicts a growth and action in the form as illustrated in this statement by Theodor Lipps:

> Looking at the spiral, I follow it, and it's separate proportions successively, I am making this spiral come into existence for me or in my perception. This spiral is first wide, then narrow or reversing the way of looking at it, first narrow, then wide. As a consequence the spiral becomes successively narrower or wider, it narrows or widens itself, and it does this in a definite manner. The existence of the spiral is a becoming.

The forms themselves are transitory, somewhere between coming and going, existing and not. When worn on the body, the wearer, redefining the piece to include the body, animates the interstices. Worn against the skin, they become almost tattoo like (fig. 16 &17).

CHAPTER 3: Mathematics and Nature

Even as I have learned more about how the mysteries of the world work through math and science, it has not taken the wonder out of the natural, it has reinforced it more. To know that the beauty of a sunflower's patterns can be distilled to the exactness of a mathematical theory is amazing. It is an example of my infatuation with the natural world that feeds my imagination. Two prominent mathematical theories used to describe natural formations and their patterns are the theories known as the *divine proportion* and *fractals,* they help to identify why nature is aesthetically pleasing.

The Divine Proportion

Divine proportion can be described succinctly as "the whole is to the larger in exactly the same proportion as the larger is to the smaller" (fig. 9). This theory can be used to help describe the visual and aesthetic appeal of so many things in the natural world as shown in Hemenway:

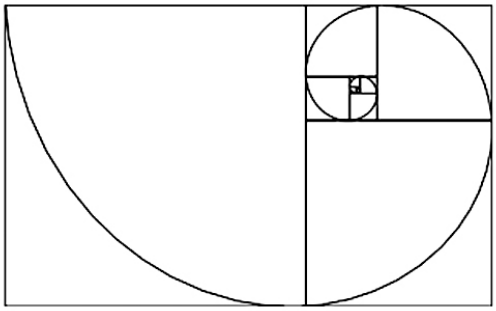

Figure 9: *The divine proportion*

> A few properties of Divine Proportion are harmony, regeneration, and balance. Its harmony is apparent in the principles of design that nature uses to give us patterns in plants, shells, the wind and the stars. The regenerative principle shows up in shapes and solids that form the basis of everything from DNA to the contour of the universe (5).

Though my work does not directly use the *divine proportion* in it's exact ratios, my attraction to and emulation of many natural forms that reflect this ratio is clearly visible.

Fractals

The mathematical theory of *fractals* describes an object or quantity that displays self-similarity on all scales. This theory can be identified in nature in many instances but a good example is romanesco broccoli (figures 10 & 11). The entire vegetable consists of small florets that progressively get bigger and make up the same overall shape. An object is said to be self-similar if it looks roughly the same on any scale. Repetition and progression of shapes is an element I use in my work. Whether it is line, shape, or method of construction, a repetitive work process is something I find methodical and soothing. Generally there are one and sometimes two shapes used and repeated throughout a piece in combination to create a greater similar shape or composition as seen in *Lacey Crescents* (fig. *12*).

Figure 10: Close up of Romanesco Broccoli

Figure 11: Romanesco Broccoli

Figure 12: *Lacey Crescents*

CHAPTER 4: Materials, Non-Precious

The use of non-precious materials is a deliberate choice. Instead I create precious objects and wearables out of non-precious materials. Through time and the influence of my hands, I transform materials into intimate objects. This gives steel, wood, copper, brass, and ceramic a precious status. Steel is the most prominently used material in my work. Being the most recycled material in the world makes steel an ideal dominant material. It is the quintessential material because the high rate of recyclability

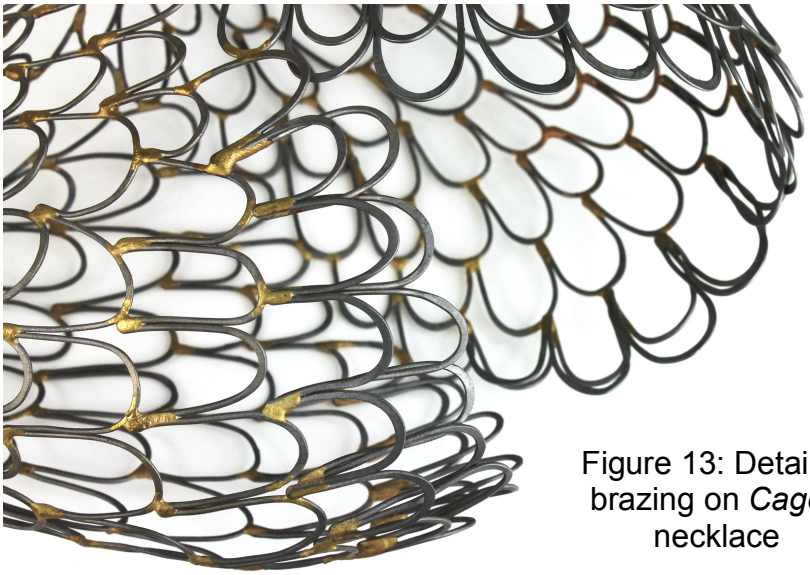

Figure 13: Detail of brazing on *Caged* necklace

makes it very cost effective, the rich dark luster achieved when blackened is visually pleasing, and the strength it has even with delicate wires is ideal. Brass is used as the bonding metal for steel because of the juxtaposing bright gold color to the black of steel. Also the bond created while brazing[1] is unique (see fig. 13). Unlike welding[2] or

[1] Brazing is the process of using melted brass as the bonding material between two metal surfaces.
[2] Welding is the process of joining two materials by melting them together

soldering[3] brazing is not brittle, but very flexible and able to be formed. Copper is used on pieces that are heavily pierced or formed. It is ideal for this because of how easy it is to saw, form. Also enamel[4] adheres well to the surface (refer to *Rain Badge* in fig. 5). As the linear predominately 2-dimensional work progressed, I pushed it by combining it with materials such as wood and ceramic that would develop a piece with more mass as well as volume. Wood is used because of its variety of colors, the fact that it is lightweight, the ease of carving and durability (see fig. 14). White clay is used for it's contrasting white to the black of the steel and also for its ease and speed of forming into many organic shapes

Figure 14: *Heart Drop* brooch

[3] Soldering is the joining process of two metals by using a lower temperature alloy as the bonding agent, generally silver or gold alloys.
[4] Creating a surface of colored glass by the application and subsequent melting of powdered glass

CHAPTER 5: Works

Wearable Lines

The first portion of my body of work called *Wearable Lines* consists of drawings on paper that have been translated into a steel wire made to be worn on the body. Within the construction and overall forms, they utilize repetitive lines and patterns inspired by nature. The process of making these forms requires repeated movements and methods creating a physical and visual rhythm in the work. With each successive line, the form becomes more animated and transforms through a steady visual progression. In essence this body of work is made as if drawn and drawn as if made as shown in the depiction of *Ripple* and its originating sketch (figs 15 & 16). In the comparison between figures 16 and 17 it is evident how the forms almost become a part of the wearer.

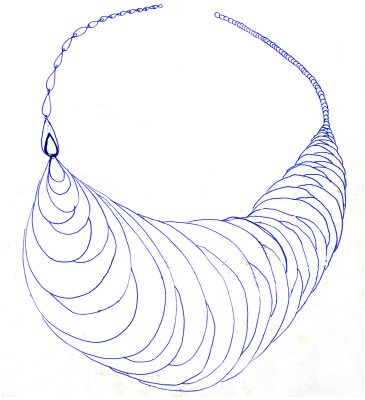

Figure 15: Sketch of *Ripple*

Figure 16: *Ripple* necklace

Figure 17: *Ripple* on the body

Line Sculptures

Successively the body of work called *Line Sculptures* came about as I struggled to push the lines and shapes of *Wearable Lines* into distinct 3-dimensional forms. In this portion of my thesis, the presence and importance of the interstices becomes more evident as the steel line draws repeated shapes that outline and contain another shape. The forms begin with repeating a crescent shape in a line of wire, and through successive layers of smaller or larger shapes, a form begins to grow. This form ultimately looks gourd like, pod like, or floral. I attribute this not only to my infatuation with the natural forms, but also to the progressive construction methods. The forms have a light delicate appearance that seems to barely exist, though in reality they are strong and occupy significant space as seen in *Caged necklace* in figure 18.

Figure 18: *Caged* necklace

Conclusion

After making a body of work and exploring its roots through this research, I feel this quote from Design in Nature explains my aesthetic. **"**The engineered world we have built...does not copy any part of the natural design; it is a manifestation of it*," (*Bejan & Zane 4). My designs are the manifestations of my surroundings and not a conscious intent to replicate.

The title "Growth Patterns" is a fitting name for this body of work in light of the patterns that have emerged in process and ideology and the growth that has occurred in me and in this body of work. I realize that beginning in my childhood and continuing onto the present, the natural environment has inspired and influenced the way I have played, learned and grown. What began outdoors learning about living has continued at the bench learning about myself. My experiences with nature have not been separate from culture and industry and this is evident in the blending of materials and processes of which my aesthetic consists. , I have realized, the use of steel, an industrial material, acts as a foil contrasting and underscoring the botanical influence of my work.

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Figure 2. *Moroccan door*, Fez. 28 March 2011. Personal photograph by author. JPEG file.

Figure 3. *Ceiling of Antonio Gaudi's Sagrada Familia Church,* Barcelona. 23 March 2011. Personal photograph by author. JPEG file.

Figure 4. *Hedge-apple,* Kesseler, Rob and Stuppy, Wolfgang. Fruit: Edible, Inedible, Incredible. Buffalo, Firefly Books. 2008. Print

Figure 5. *Rain Badge*, brooch. 2011. Personal photograph by author. JPEG file.

Figure 6. *Swirl Brooch.* 2012. Photograph by Tara Locklear. JPEG file.

Figure 7. *Tri-Tear Drop,*brooch. 2012. Photograph by Tara Locklear. JPEG file.

Figure 8. *Burgeoning,* brooch. 2012. Photograph by Tara Locklear. JPEG file.

Figure 9. Doczi, Gyorgy. The Power of Limits: Proportional Harmonies in Nature, Art and Architecture. Boulder, Shambhala Publications Inc. 1981. Print

Figure 10. Walker, John. Fractal Food: Self-Similarity on the Supermarket Shelf. Cellular Automata Laboratory. 2005 http://www.fourmilab.ch/images/Romanesco/.

Figure 11. Walker, John. Fractal Food: Self-Similarity on the Supermarket Shelf. Cellular Automata Laboratory. 2005 http://www.fourmilab.ch/images/Romanesco/

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Figure 13. *Detail of brazing on Caged necklace.* 2012. Photograph by Tara Locklear. JPEG file.

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Figure 18. *Caged,* necklace. 2012. Photograph by Tara Locklear. JPEG file