

{organ}ics:

Exploring the Parallels between Plants and Human Anatomy through Sculpture and
Watercolor Painting

By

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Table of Contents

Abstract.....	3
Part One: The Inspiration.....	4
Part Two: The Biology.....	7
Part Three: The Process.....	9
Part Four: The Exhibition.....	16
Part Five: Reflections.....	18
Conclusion.....	19

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ABSTRACT

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Integrating my two passions of the visual arts and science for my senior thesis, I created a collection of paintings that represent human organs and the parallels between plant biology and animal biology. Genetically, plants are just as complex—if not more—than many animals. They have intricate sensory and regulatory systems highly comparable to humans, and on a cellular level, we share many analogous features. In addition, every single carbon atom that makes up the human body was at one time fixed in a plant during photosynthesis. We also rely on photosynthesis to give us the oxygen we breathe. Embracing these facts, I used plants and flowers to create sculptures of human organs, and then painted the sculptures in watercolor. My work is a step aside from conventional medical illustration and into creative representation.

There is a delicate balance in using one specific type of nature to embody a superficially different form of life; this compelled me to take each step of the creative process methodically and with precision. In each sculpture, I focused on mimicking texture and shape of its corresponding human organ in order to create a realistic subject conveyed in painting. I deliberately incorporated shadow to give the impression that the subject is fully tangible. In each painting, I employed fine detail to capture the way that plant and human anatomy are equally sophisticated in structure. It is then left to the viewer's curiosity: if we are analogous in so many ways, then what exactly characterizes us as human?

Part One

The Inspiration

The development of my senior thesis topic in the Visual Arts took place over the span of several months during the fall term of 2015. I was enrolled in a Senior Studio Project in which I planned on experimenting with various art media, advancing my drawing and painting skills, as well as finding a way to assimilate my interests in art and science into a conjoined collection of work. In brainstorming sessions, I had come up with themes such as illustrating model organisms, or illustrating different types of medical imaging, like the MRI and x-ray. I had also done a study on eyes and vision, which led to a study on general medical illustration. I researched Frank Netter, M.D., a distinguished medical illustrator whose work became a standard reference in medicine. It didn't take me long to realize that not only was Netter's work unbelievably detailed, but he had recorded the human body with real materials as opposed to just pictures on a screen or in a book like I was trying to use. I decided that I needed to shift focus to a subject that I could physically see and touch. I needed to be able to examine the details, and experience the true colors and three-dimensionality of my subject.

After even more research and several meetings with my thesis advisor, I was introduced to Vesna Jovanovic's work. Jovanovic, an artist based in Chicago, has focused her work on re-conceptualizing medical illustration through the use of various media, including graphite and watercolor.¹ I found her *Foreign Bodies* collection to be the one that I admired the most. In this collection, she allowed

¹ Vesna Jovanovic, "Biography."

spilled ink to take over a plastic-like paper called Yupo. Jovanovic then observed the form that the dried paint created and used graphite to illustrate an accurate human anatomical structure. Each of the paintings included a “foreign body,” or something in the body that didn’t originate there. For example, after hearing a story of a man that inhaled a pea and it sprouted in his lung, she depicted just that—a sprouting pea in her illustration of a lung.² The *Foreign Body* pieces were simultaneously abstract and factual; they were tremendously intriguing and made me realize that I wanted to create a senior thesis topic that was not conventional medical illustration.

My final and biggest inspiration came from Camila Carlow, an artist based in Britain.³ I came across a collection of her work called “Eye Heart Spleen” when I had been researching human organs as sculptures. I began searching for sculptures because I had recalled from studying Netter that I wanted a physical subject to use for painting, and I was also looking for any sort of creative representation of the human body that sparked an interest. I found myself mesmerized by a photograph of green mosses, purple flowers, and red berries arranged into the shape of a human heart. Carlow created a set of kidneys from another species of green moss and vines and she formed a set of lungs from white, pink, and purple wildflowers; she arranged a total of thirteen human organs and professionally photographed them.⁴ My mind began at the thought of forming my own arrangements or sculptures of various human organs, however portraying the subject in watercolor paintings rather than photographing them.

² Jovanovic, “Foreign Bodies,” 2013

³ Camila Carlow, “About,” 2009.

⁴ Carlow, “EYE ‘HEART’ SPLEEN,” 2011.

I realized that this was a theme that I could take to many levels: I could compare the genetics and structures of these two biological kingdoms, I could reference how plants and flowers trace back to the same cyanobacteria that humans evolved from, and I could discuss how the photosynthetic process in plants is crucial to the production of oxygen needed to sustain human life. Using plants and flowers to represent the human body made sense for so many biological reasons. Not only that, but I had accomplished my goal for my Senior Studio Project: I created a comprehensive thesis involving art and science.

Part Two

The Biology

Understanding animal biology and botany was vital to the creation of *organics*. The origins of all living matter are single-celled bacteria, or prokaryotes. They eventually evolved through a process called symbiogenesis into eukaryotes, where prokaryotic microbes fused to become complex cells with nuclei.⁵ For instance, mitochondria, the energy-creating organelles in eukaryotic cells, were once engulfed by other prokaryotic cells to create symbiotic mergers.

These eukaryotic cells are the building blocks for animals—including humans—and plants. While they have developed into seemingly very different forms of life, they share many genetic and structural characteristics. Despite plants being more genetically complex, there are many genes that were conserved in the development of the plant and animal kingdoms, such as the regulated response to light.⁶ Humans have photoreceptors in the eye, called rods and cones, which detect electromagnetic (EM) waves in the visible spectrum. Plants not only have photoreceptors to detect all EM waves (visible and invisible), but they can also pick up on ultraviolet rays and infrared waves.⁷ One photoreceptor, cryptochrome, is present in both humans and plants and is responsible for our internal clocks. It tells us when there is blue light present, signaling that it is daytime. Therefore, based on circadian rhythm, the fern hanging on your porch can get jet lag just like us!⁸

⁵ Margulis, 1998, p. 6.

⁶ Daniel Chamovitz, *What a Plant Knows: A Field Guide to the Senses*, 2012, p. 4.

⁷ Chamovitz, 2012, p. 9.

⁸ Chamovitz, 2012, p. 25.

Plants have complex sensory and regulatory systems that go beyond “seeing.” They can also smell, feel, hear, and remember—at least to the greatest extent that can occur without a central nervous system.⁹ These systems and processes are vital to the survival of plants, and ultimately the survival of animals. For example, humans need oxygen to breathe and carbon dioxide to be removed from our atmosphere. Along with light energy from the sun, this is done through photosynthetic processes in plants, which simultaneously gives the plant energy. It is therefore important to note that every carbon atom that is present in animals, including you and me, was at one time fixed in a plant during photosynthesis.¹⁰

With all of these biological resemblances and dependencies, it made sense that the kingdoms of plants and animals could come together for *{organ}ics*. That is, in fact, how my thesis got its name and my paintings their titles. Down to the organic chemistry of plants and animals, of leaves and human organs, we not only coexist, but we are dependent on each other.

⁹ Chamovitz, 2012, p. 5.

¹⁰ Joanna E. Burgess and Brett I. Pletschke, “Carbon Fixation,” p. 1.

Part Three

The Process

The most fundamental part of my senior thesis was complete by the end of Fall Term in 2015. I knew the topic of my work. Best of all, I was excited about it. Next I needed to figure out several things: where am I going to get plant materials, how am I going to carry out the process of making a sculptural arrangement of plants and flowers, and how will I go about portraying it in a watercolor painting?

On one drizzling afternoon in early November 2015, I walked into Jackson's Gardens, scissors and a plastic bag in hand, and walked around collecting whatever plant material I could find. I scooped up fallen leaves and pine needles, cut handfuls of grass from alongside the creek, and picked from patches of wildflowers. I even collected acorns and sticks on my walk back to my studio. Upon arriving at my studio, I set out boards on the floor lined with paper towels, and organized the things I had collected (Figure 1). To my surprise, I had collected enough plants to create several organ sculptures. My first, I decided, was going to be the kidneys.



Figure 1.
Collection of plants on the studio floor,
used for constructing sculptures.

Creating an organ sculpture was a tedious task. It involved sifting through my collection of plants to find leaves and flowers that either mimicked the texture of the corresponding organ tissue, could easily be arranged to match the shape of the organ, or both. After I decided on the species I wanted to use, I arranged them in several different ways until I liked the way they looked. Sometimes that entailed clipping stems or removing leaves off of flowers. I often used medical illustrations to assist me in creating a similar or, when I got lucky, an exact shape of the human organ.

Once I was satisfied with my kidney sculpture (Fig. 2), I had to plan how I was going to actually paint it on paper. Was I going to do this true-to-life size? Once I create my kidney painting, should I make all of my other paintings to the same scale or orientation? I made my decision by drawing in my sketchbook: I would use the same size paper for each painting, regardless of how large a sculpture was, and the orientation of the paper would depend on the shape of the organ. As a result of using the same size paper, I determined that the scale of the organs, in relativity to each other's real proportions, would not be the same. I planned on using smaller sheets—10¼ by 7 inches—because I decided that if I used anything larger, I would get lost in the details and would not have as many pieces as I wanted. My original goal was to paint ten or so organs throughout the winter and spring terms.



Figure 2.
Sculpture used for creating
Thuja occidentalis + Wildflower, Kidney.

Watercolor is a medium that I specifically chose because of its capacity for control. With it, I have the ability to let it bleed on the paper where I wanted to, but also get extremely meticulous where I needed it. In regards to the detail in my paintings, I took each move with great caution. I experimented with color and with finding the correct fluidity of the paint before touching the surface of the paper. In addition, I heavily used paper towels as a tool to manipulate saturation of colors and adjust shading.

I wanted the plants and flowers to seem as real as possible, and in order to do that, I had to create the sensation that they weren't just floating in space; shadow helped accomplish that. When the plants and flowers were completed in watercolor, I used a light gray for a shadow, and since I used the same lighting for each of my paintings, the shadows were all positioned the same.

Building upon my use of shadow—so as to give the paintings an even greater sense of three-dimensionality—I decided to show my artwork in shadow-box frames. I got the idea from the typical showing of specimen in scientific

presentations. The creation of the shadow-box frames were actually quite simple; the paintings were all the same size, therefore the frames were also the same size. I decided to not include a glass or Plexiglas covering to avoid glare and to encourage my audience to take a close look at the detail in the plant and flowers. I painted all of the frames in black to keep them as uniform as possible.

Although the quantity of paintings was not what I had originally planned, I was satisfied with what I had achieved and I surprisingly felt like the collection was complete with seven paintings (Fig. 3-9). While I was working on creating my artist statement and developing titles for my work, I simultaneously started working on my catalogue. This was a unique opportunity to showcase my artwork in one consolidated place, side by side with my artist statement and explanation of my process. The finished product was distributed to the people that helped contribute to my thesis, whether through advisement or moral support. I also kept a copy to accompany my paintings at my show for my audience to browse.



Figure 3.
Thuja occidentalis + *Wildflower*, *Kidney*
 2016, Watercolor on paper, 7 x 10 ¼ in



Figure 4.
Ginkgo biloba, *Stomach*
 2016, Watercolor on paper, 7 x 10 ¼ in



Figure 5.
Cyclamen persicum, *Heart*
 2016, Watercolor on paper, 7 x 10 ¼ in



Figure 6.
Cereus monstrose + *Gymnocalycium*
cultivar, *Brain*
 2016, Watercolor on paper, 7 x 10 ¼ in



Figure 7.
Viola tricolor var. *hortensis*, *Uterus*
 2016, Watercolor on paper, 7 x 10 ¼ in



Figure 8.
Bryopsida, *Pancreas*
 2016, Watercolor on paper, 10 ¼ x 7 in



Figure 9.
Plectranthus scutellarioides, *Liver*
 2016, Watercolor on paper, 10 ¼ x 7 in

For the fabrication of the catalogue, I used Adobe InDesign. This was an application that was completely new to me, so once I figured out how to operate it, I was able to get creative with designing the cover and inside pages (Fig 10). This included finding the fonts to use, organizing the layout, and professionally photographing the paintings. With its completion, I only had one more thing to do: curate my work for the Senior Art Exhibition in the Nott Memorial.

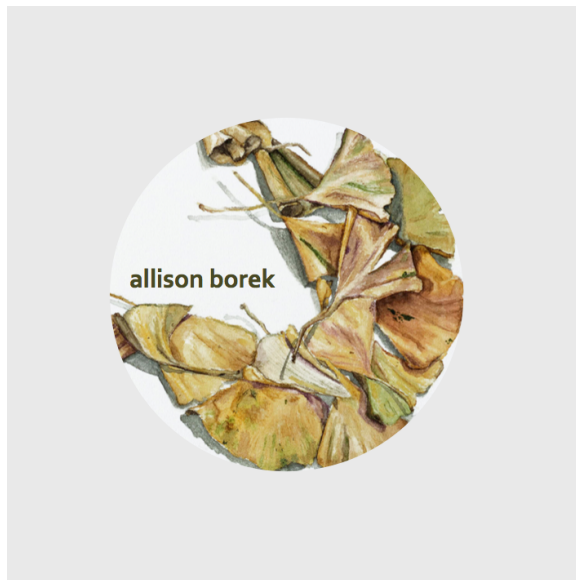


Figure 10.
Cover design for the *{organ}ics* thesis catalogue.

Part Four

The Exhibition

The Senior Art Exhibition this year was different than in previous years. With the renovation of the Visual Arts Building, we did not have our regular gallery space to host our senior showcases. Instead of the typical one-week shows throughout Spring Term, in which you present your work alongside only two or three other seniors at a time, we were doing it as a class. Eleven highly talented senior artists were sharing the second floor of the Nott Memorial, also known as the Mandeville Gallery, with the show running from May 23, 2016 through Union College Commencement on June 12, 2016.

As a result of having all twelve Visual Art students simultaneously show their thesis work, space in the Nott was limited. I received four panels to hang my work and artist statement. Each panel was about three feet wide and eight feet tall. I chose to organize it in a left to right fashion, starting with my artist statement and kidney painting on the first panel, followed by the pancreas and uterus on the second panel, the brain and the stomach on the third panel, and the heart and the liver on the fourth panel. Below my work on the first panel, I decided to show my sculpture of my kidney on a pedestal. I felt that it was important to show the sculpture side of my process, even if I only had space for one.

While the show opened on Monday, May 23rd, we had an opening reception on Thursday, May 26th for the show. It was open to the campus community and the general public, so I was expecting a lot of people to come by to see all of our work. I

was truly impressed and humbled by the turnout. So many friends, professors, and even family that drove in from Western New York, all came to support us.

I was so grateful for all of the positive feedback in response to the show; it confirmed that all of the work that I put into my thesis was worth it. One comment that left an impression on me was from a former student that was in my drawing class in the Fall of 2012, my first term at Union. After taking a look at all of my paintings, he told me he couldn't believe how much I had accomplished and improved since that first term of college-level art experience. He was one of the most talented artists I have seen at Union, so it meant a lot to me that he recognized my development. Also, my previous painting professor, Walter Hatke, had the opportunity to come to the show, so to have him there and telling me that he was impressed with my work really touched me.

At the end of the evening and after the Nott Memorial had cleared out, I had the opportunity to go around, look at the other seniors' work, and admire the diversity between them. Out of the twelve of us, I was the only person to use watercolor. Other media included charcoal, printmaking, sculpture, photography, digital design, oil painting, printmaking, and ceramics. Even through the absence of the Visual Arts Building, I was amazed with my fellow artists, and proud of all the work we had accomplished.

Part Five

Reflections

Looking back at my first year at Union College, I never could have imagined where my interests in art and science would lead me. I started out as a Biology major and a Visual Arts minor. I was on the pre-medicine track, and at the time, I believed that I had to major in a science. After realizing that I could remain on this track even if I changed my major away from the sciences, I didn't hesitate to switch my major and minor. While I still find biology and the process of the human body absolutely fascinating, art was, and still is, my passion. I couldn't picture spending the majority of my college career and writing a thesis on something that my heart wasn't one hundred percent invested in.

Owing to the flexibility of the Visual Arts thesis, I easily determined that I would integrate my other academic interests into my work. Although it was a challenge, I don't think I could have come up with a thesis topic that was more ideal for those interests and for my style as an artist. Throughout the process, I learned so much about painting technique, control of the medium, and color matching. I also gained knowledge in photographing artwork professionally, designing an artist catalogue, and curating an exhibition.

Conclusion

In order to comprehend *{organ}ics*, it is important to recognize the parallels between the biology of plants and animals. On the surface they appear to be incomparable, yet on a micro scale, the analogous features between them are profuse. Moreover, humans rely on the biological processes of plants for basic survival: we depend on them for oxygen and for food. We have even come to use them for signifying human emotion, love, faith, and fertility, among many other things. Ultimately, *{organ}ics* is an artistic and symbolic representation of the human anatomy, paying tribute to the indispensable relationship the kingdoms share.

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