MECHANICS IN ART

by

BENJAMIN MCKEE

BFA Sculpture, Alfred University, 2009

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment
of the Requirements for the Degree

MASTERS OF FINE ARTS

ATHENS, GEORGIA

2012
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Larry M. Millard, 05/01/2012

Major Professor: LARRY MILLARD

Committee: LARRY MILLARD
MARTIJN VAN WAGTENDONK
JIM BUONACCORSI
GEORGIA STRANGE
Over the course of three years I’ve been working at the University of Georgia towards a Master’s Degree in fine art. The experiences I’ve had both in and out of school over the last years have changed me as a person and as an artist. When I first began my graduate studies, I felt as though in order to become comfortable enough to experiment, I had to become comfortable in my surroundings. My previous work was based mostly on the aesthetic of the cars and motorcycles on which I worked the process of working on vehicles, and the experience of working in automotive shops. The first few projects I undertook as a graduate student drew on very familiar skills and concepts. Working with old car parts and basic construction techniques, I completed a few pieces that where homages to my upbringing and to my past. When I look back at these pieces I see that my early graduate work was just an attempt to cling to what was familiar and comfortable. It wasn’t until I challenged myself that I really started to develop as an artist. By completing my first kinetic pieces, Cardiac Prosthetic and Heart Strings, I literally separated my heart from what was at that time home.

Cardiac Prosthetic –
Fabricated steel, Cast Iron,
Lurecraft – October 2009
Heart Strings - Fabricated Steel, Cast Aluminum - February 2010

When comparing the work of artists who are developing in an academic environment (my students and peers) to those who are developing in a non-academic environment (my friend Daniel) there is a huge discrepancy in the handling of mistakes. In the academic setting students are often guided back on track before a mistake is made (Jane is told to operate a drill press at a slow speed and whether she does or not is dependent on how well she listens and how effectively the instructions are communicated) whereas when my friend Daniel works in his shop he does one of two things: he researches the speed at which he should drill a hole and learns that in this circumstance using a half inch bit on 1/4 inch think plate his drill should be set at 420 rpm. If Daniel does the research he is more likely to retain the information and truly develop a skill, whereas Jane, who was told by another questionably qualified person, breaks her drill bit. Daniel is responsible for
replacing his drill bits, Jane is not. A level of accountability is crucial in a functional learning environment. I constantly wonder if the academic environment allows me to make enough mistakes, which are a critical part of my creative process. Part of this format has to do with my thought process. I believe that this way of thinking is purely an instinctual thing. For example, I'm capable of working hours and hours on a repetitive task such as turning something on the lathe or fabricating multiple parts that are all the same. However when I sit down to conceptualize a piece, beginning, middle, and end, I become frustrated and a bit lost. The physical act of making becomes necessary for me to create. For example at one point during my second semester I was having difficulty coming up with a new project. Instead of sitting and focusing on coming up with an idea I opted to begin fabrication on a new motorcycle project. While working on the motorcycle I acquired some new switches and components as well as the two gallons of motor oil drained from the engine. This side project led to the piece Beneath, one of my most successful kinetic works to date. As Wernher von Braun once put it, “research is what I’m doing when I don’t know what I’m doing.”

Beneath - Stainless Steel Surgical Needles, Motor Oil - February 2011
I am inspired by many things, artists, inventors, innovations in technology and science, my discoveries of new materials and tooling associated with these materials. When I watch the process of artists and their studio practices (the ones that don’t keep their practices and methods completely hidden) I feel that my artistic process has more in common with the scientific method and the cyclical routines of scientific process. My working process involves testing variables and finding solutions to problems. For example in the piece *Identity* I wanted to use an electromagnet to raise a pool of iron particles and oil.

Unfortunately the electromagnet would overheat with the wattage I needed to put through it (240 volts AC at 20 amps,) so I built a liquid cooler using copper tubing, a water pump, fans, and a storage reservoir.

*Identity - 240v Electromagnet, Microcontroller, Fabricated Stainless Steel September 2011*
I feel like so much of the story is left out when it comes to artists and their work. Secret methods and practices and a lack of explanation or understanding of one's own process frustrate me. Perhaps people feel the same frustration when I speak conceptually about my own work. I feel that by sharing everything I can better my own work and better the work of others around me. I believe in the spirit of open source theory and DIY (Do it yourself) culture.

As I continue to develop, I find things that I am unexplainably attached to because of their aesthetic and conceptual connotations. The relationship I subsequently form with them becomes a driving force in my work. For example the stainless steel surgical needles found in the piece Beneath and The Table represent fear and pain, but also a material elegance in the precision with which they're manufactured. I become inspired and fascinated by materials such as these.

The Table - Stainless Steel Needles, Servo Motors - August 2011
For each component in a work there are a series of choices to be made. An example would be building a metal tray to hold something. When addressing a new problem, my initial concerns are often functional: How much weight does it need to support, how thick does the material need to be to be strong enough, what does it cost? As a young artist I believed Louis Sullivan when he said:

"It is the pervading law of all things organic and inorganic, of all things physical and metaphysical, of all things human and all things super-human, of all true manifestations of the head, of the heart, of the soul, that the life is recognizable in its expression, that form ever follows function. This is the law."

During most of my previous work my secondary decisions were usually aesthetic: What makes this look good? What material works with these surroundings? This meant that conceptual implications were often left for last. When I began making work I feel like these three questions where always being asked sequentially, and that I struggled to consider them as they pertained to the piece as a whole. One of the most drastic changes in my work since my undergraduate studies and something that I am proud to be leaving with is the ability to consider these three questions simultaneously while approaching a project. As a more developed artist, I would side more with Frank Lloyd Wright, believing that "form and function should be one, joined in a spiritual union."

Another area that has been a driving part of my work had been my understanding of the viewer in relation to my work. While I feel that considering a piece as it relates to viewers is crucial to being an artist I feel the same burden that advertisers and corporations
must feel when they try to reach the largest audience possible. The partially frustrating part is that the audience in art school is relatively fixed. Even though we get a chance to show work outside of the school it’s often the academic crowd that is interacting with it.

A viewer’s interaction as part of the piece needs to be taken into consideration by the sculptor. Once a work employs a varied state a dynamic interaction occurs between the viewer and the piece. To put this in other terms the piece is the controlled variable (controlled by the artist) and the viewer is the dependent variable. If the controlled variable is constant, for example a marble statue, then the dependent variable will also be constant.

If the independent variable is changing, as with an audio piece or a video or a kinetic work, then the dependent variable will also change. While a person viewing a marble statue could have a varied reaction to a static object, a person viewing a moving piece must have a varied reaction because the piece is constantly is changing. I find that constructing a work
that is constantly in flux is one of the most appealing aspects of the work that I make. The
viewer’s anticipation of the next stage of the piece is something that is of significance.

The use of moving components in artwork fascinates me. In my time working with
motors and mechanical components I feel I’ve become enchanted with the difficulty of
making something function. When making a piece that requires functional components
there is a specific order and type of working process that must be implemented. Maybe
this is why I always liked those connect the dots puzzles. You know that there is going to be
an outcome that results in an image, you know there is a very specific path to get there, but
each step must lead to the next step. I remember a ceramic artist I met while studying in
Italy that told me “every artist has a certain about of material resistance they enjoy
engaging. Clay has minimal resistance, wood is more resistant and metal even more so.” I
feel most people seem to like a certain amount of order to their work, somewhere between
complete order and complete chaos. I enjoy making work that has a right and a wrong
answer. It has two states, it’s either working or it isn’t. While I mean this literally in most
cases I do feel the idea of a piece “working” on a metaphorical level is just as important.

Binary language is a black and white system that translates into something infinitely
more complex. Almost all electrical systems, circuit boards, integrated circuits, vacuum
tubes, and many other electrical components rely on an on-off state to function. This
“switching” of power is what translates into images on a television or music through
speakers. All the complexities of these things at their cores rely on anywhere from tens to
billions of on off switches. Human engineering is often based off of the natural systems that
we see around us. Although the natural world is seen as an infinitely variable system, it is comprised of many binary relationships. A human heart is either on or off. Enzymes are just puzzle pieces that fit into each other.

As an undergraduate, I taught myself the entire Adobe creative suite. By learning digital imaging processing techniques, I was able to plan out my sculptural work, as well as explore concepts quickly through photo-manipulation and digital rendering. The 2-d work would often become finished works in themselves, but were intended as studies for sculptural pieces. In much of my two-dimensional work I attempt to explore the principles and theories behind human personality. I’m interested in what makes us happy and sad, but more specifically how we come to a state of happiness.

What happens biologically that produces a feeling or physical reaction? These works often functioned as the opposite as a technical drawing, becoming, despite their lack of dimensions or blueprints, a sort of conceptual map of a developing piece. These earlier works, technical works weren’t as necessary because they weren’t complex enough to require them. It could all be done in my head. As I continued to explore digital techniques, however, I began to
employ 3-d modeling software in conjunction with photo-manipulation, in order to plan the technical side of my work. This ultimately allowed me to bring more complex pieces to fruition.

Internally, I had always been trying to transform these two dimensional ideas into three-dimensional objects. Through my research into emerging sculptural techniques I came across different pieces of equipment with which to bring a three-dimensional model into reality, some of which are additive and some of which are subtractive. 3-d printers are additive, building a model with drops of a molten material, usually plastic. CNC routers are subtractive, using precision motors to position a cutting tool within a space. After researching both pieces of equipment I decided to undertake the building of a three-axis CNC router. In the beginning it gave me the ability to experiment with translating a computer model, inch by inch, into real, tangible objects with precision down to a thousandth of an inch. Later it became a sort of assistant. CNC equipment has often been criticized for removing the hand of the artist. I see it as an extra
hand, allowing me to mass produce components with incredible precision while I work on yet another idea.

While building my thesis piece, *The Machine*, I began experimenting with precision machining techniques. I have always taken pride in a precisely made component or part and I have a desire to continue to perfect my abilities. I’ve gone from seeing a sixteenth of an inch as a precise measurement interval to seeing a thousandth of an inch as a precise interval. It is a crucial realization that played into the construction of the piece. At the heart of the machine there is a two axis table placed in a pan of used oil. It positions a tray
with twenty eight light bulb shells underneath an oil sprayer. The motions of the inner tray where inspired by the motions of CNC equipment. For the "brains" of my machine I still turn to the Arduino brand of microcontrollers. While not the most powerful pieces of hardware on the market they do offer the most community support and accessories of any other microcontroller I've found.

I see my works as a replacement for engaging with me directly. Through my work I communicate by action, allowing my sculptures to translate my perceptions of human interaction. The activity embodied in my work captivates attention and expresses my observations in a dynamic fashion. As humans we have a limited ability to communicate and translate our internal thoughts to one another. I exemplify this condition, drawing on both the emotional and scientific aspects as they apply to all people. The machine embodies a very specific level of control. I have fluctuated between various levels of control in my work, from having a piece that the viewer switches on and off, to having a pieces that a viewer's presence determines the action, or simply removing all control from the viewer and making the piece be at my control. I think that subconsciously there is an inverse relationship between how much control a viewer has in one of my works compared to how much control I have over my own life. Recently, my pieces have been almost entirely within my control. I refuse to leave anything to the viewer's discretion.

As I leave the University of Georgia I am comforted by a wealth of technical expertise, which I have learned to use to express the beauty of movement to viewers. I have started to design and program my sculptures to react to an observer, becoming a
stand-in for the creator. I hope to incorporate new industrial technologies, both electronic and mechanical as I continue to draw on the various historical aesthetics of the machine. Ultimately I am seeking contemplation, creating active participation and intellectual interaction from the viewer. My work creates an illustration and visualization of the process of human communication, shared with viewers in a beautiful and compelling manner.