

Sarah Hulsey

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Thesis Committee: Julianna Foster, Daniel Heyman, and Tara O'Brien

Thesis Faculty: Peter Kruty, Martha McDonald, and Susan Viguers

Director: Susan Viguers

Abstract

The thesis paper included in this packet discusses the background, motivations, process, and content of my MFA thesis studio work. It outlines my interests in the analysis of complex systems, including linguistic data and archeological findings, and the visual correspondences I have developed to explore the intricate patterns contained within the systems. I plot and chart their inter-related parts, finding both rhythm and mystery in the way small visual elements assemble to represent complex wholes. My work often integrates paper and fiber techniques, which attract me because the surface of paper and fabric offer the possibility of three-dimensional properties, which I highlight in installations that reveal both sides of ostensibly two-dimensional objects. This packet also contains a current *curriculum vitae*, artist's statement, images of work from my thesis, and an image list.

Translational Cartography:
Visual Investigations of Complex Systems

Sarah Hulsey

May 2, 2013

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Thesis Writing Faculty: Martha McDonald

Abstract

This thesis discusses the background, motivations, process, and content of my MFA thesis studio work. It outlines my interests in the analysis of complex systems, including linguistic data and archeological findings, and the visual correspondences I developed to explore the intricate patterns contained within the systems. I plot and chart their inter-related parts, finding both rhythm and mystery in the way small visual elements assemble to represent complex wholes. My work often integrates paper and fiber techniques, which attract me because the surface of paper and fabric offer the possibility of three-dimensional properties, which I highlight in installations that reveal both sides of ostensibly two-dimensional objects. I use handmade paper, stitching, and printing with dyes to investigate relationships between the analytical content and the lyrical outcomes resulting from the visualization of intricate systems.

Introduction

In my art practice, I take elements in a system and carefully sort, arrange, and rearrange them to elucidate complex phenomena and reveal patterns hidden within the data. As a former academic linguist, I have long been fascinated by the patterns and organizations of language and have come to focus on this as a source of inspiration for my art making. My work plots and charts systems of inter-related parts, including natural language and archeological artifacts, finding both rhythm and mystery in the way small visual elements assemble to represent complex wholes. Of my thesis projects, two are concerned with language as the system to be examined; the third focuses on archeology.

My interest in making art and my interest in thinking about language have different origins and only came together over the course of this Masters program. During the first year in the program, I began to realize that I am particularly interested in making work about systems and the relationships of parts and wholes within them. This realization allowed me to treat language as a system to be represented visually, which opened up possibilities of creating personal approaches to diagramming and charting that exist primarily as visual arrangements of abstract elements while still expressing linguistic relationships.

I came to this MFA program from a background in Linguistics, a field in which I received both Bachelor and Doctoral degrees. I was drawn to the study of language by a strong attraction to the highly complex order that underlies language—especially syntax, or sentence structure—as revealed by the discoveries of modern, Chomskyan linguistics. Noam Chomsky and his students and followers have discovered that languages share a highly constrained set of possible properties and configurations. Any given language can be described as having a certain combination of those properties and configurations, each of which could be shared by other languages both very similar and widely different. For me, it was a sense of wonder at the cognitive order underlying the apparently messy field of language, together with the rigorous application of the scientific method, that led me to study linguistics for so many years.

Ultimately, I found that despite my attraction to the results and the procedure of doing linguistics, I did not possess a strong enough need to actually solve the puzzles that remain in our knowledge of language. Linguistics turned out to be interesting for me primarily as a representation of a complex cognitive system, but the appeal was not in the discovery of the details of that system. I have turned to art as a way to investigate my attraction to complex, varied systems because art allows me to explore the idea of a complex system in its system-ness, rather than in the specifics of the particular data involved.

A visual analysis of 28 sentences: *Conversations in Syntax*

The first piece in which I explored language as a system to be diagrammed was *Conversations in Syntax*, which consists of a series of 28 representations of sentence structure stitched on paper. For the project, I chose 28 arbitrary sentences from conversations and created a visual diagramming system for them. These diagrams are neither the traditional Reed-Kellogg diagrams taught to high-school students nor the phrase structure trees used by linguists. Rather, they are a system I created (fig. 1).



Figure 1: *Conversations in Syntax* (2012); photo: Erin Paulson

I left out the actual words in the sentences and focused on how the words are grouped into phrases, which are themselves grouped into other phrases. Each word and phrase is represented by a rectangular box, nested inside of a box representing the phrase that immediately contains it (fig. 2, 3). Each box is stitched directly into a semi-transparent sheet of handmade abaca paper.

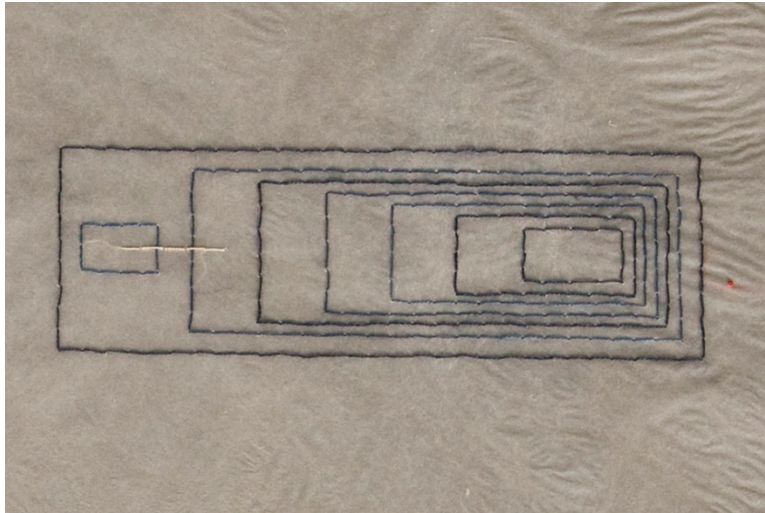


Figure 2: *Conversations in Syntax*, detail (2012); photo: Erin Paulson.

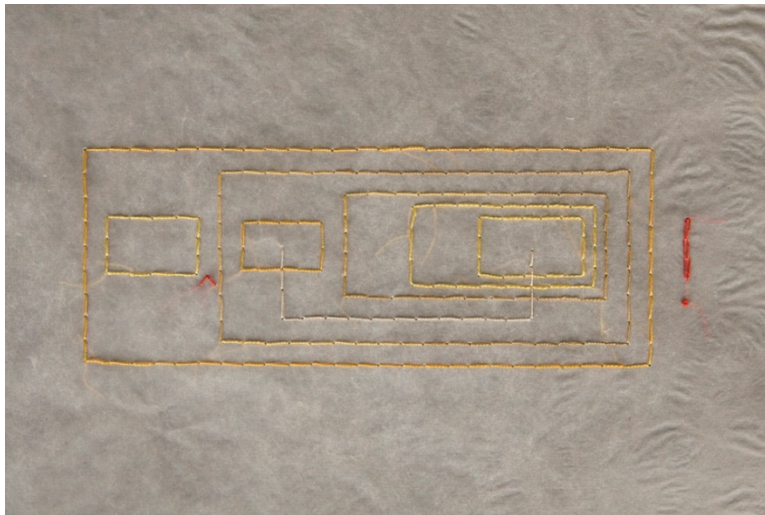


Figure 3: *Conversations in Syntax*, detail (2012); photo: Erin Paulson

I created a further system by color coding the sentences according to meaning-based relationships, with similarly themed sentences stitched in the same color.

As I developed the system used to visually represent the syntactic relationships, I experimented with a number of different shapes. From a linguistic point of view, the shape chosen could have been anything, and, indeed, around the same time I created a

design for a textile pattern than expressed similar syntactic relationships by shapes reminiscent of blobs on a topographical map (fig. 4).



Figure 4: Textile design based on syntactic structure of cartography text (2012); photo: Erin Paulson

In that case, such shapes seemed appropriate because the subject matter was about cartography (a topic I returned to later for my thesis work). For *Conversations in Syntax*, however, the true subject matter of the piece is not the content of the sentences, which I chose randomly so as to avoid focusing on their meaning. Instead, the subject matter is the organization of language itself from a word-and-phrase point of view. The appeal of such systems for me is as much about their internal arrangements and grouping of smaller elements into the whole as it is about the mechanics of how they work. For this project, rigid rectangular boxes seemed best to express the building up of a sentence phrase-by-phrase.

I chose stitching as a technique for this project because of the ability of thread to contribute a continual, connected line running throughout the diagram. This gives the thread a kind of drawing-quality but in a more continuous way than a drawn line usually does. In the process of drawing, one often picks up the tool and starts a new line, unconnected physically to the previous mark. With stitching, however, that invisible link between the end of one line and the start of the next exists physically in the form of a segment of the thread on the reverse side of the surface. Paradoxically, embroidery appears to be more discrete than drawing because it is (almost) always composed of small, individual stitch-elements. And yet, because these individual stitches are linked to the next on the back, it is far less discrete a medium than one that allows you to lift your tool at will and place the next mark unconnected, at any distance from the previous mark. In this sense, embroidery is an ideal medium for work about language which is likewise made of elements both discrete and linked by hidden connections.

The creation and investigation of systems is an important component in the work of many artists, among them Tauba Auerbach, who uses print and book media, among others, to explore systems. Auerbach is an artist who does a lot of work related to language, but like many artists working on language, her work in that area tends to focus on written language, which is not my area of interest. Instead, I feel a kinship

more with her work that focuses on other kinds of systems, such as her recent project *RGB Colorspace Atlas* (2011).

RGB Colorspace Atlas is an artist's book consisting of three cube-shaped volumes, each of 3,632 offset printed pages. The atlas explores how color works in the human visual system, which for most individuals involves three color receptors sensitive to areas on the color spectrum corresponding roughly to red, green, and blue. As described by the Museum of Modern Art's (MoMA) website for their 2012 show *Ecstatic Alphabets/Heaps of Language*, Auerbach took these three sections of the color spectrum and created a gradient with slices ranging from 0% to 100%. She then created a cube in which each of these gradients form one axis, giving a cube that models "the visible spectrum in a three-dimensional spatial model" (MoMA) (fig. 5).



Figure 5: *RGB Color Atlas*, Tauba Auerbach (2011); photo: taubaauerbach.com

Each page of the book is printed with a slice of the three-dimensional model, showing a gradient of colors from the bottom right to top left of the page, blending in the middle.

As one flips through the book (or views an animation of it on the MoMA website), the gradients slowly change along the third axis, ranging through the whole human visual color space. (fig. 6)



Figure 6: *RGB Color Atlas* (red), Tauba Auerbach (2011); photo: taubaauerbach.com

The three volumes show the same cube, but orient it differently, positioning the red axis perpendicular to the plane of the page for *RGB Colorspace Atlas: Red Axis*, the green axis perpendicular to the plane of the page for *RGB Colorspace Atlas: Green Axis*, and so on. As MoMA describes it, the result is “both a sculptural object and a spatialization of color” (MoMA).

Part of what I find so compelling about this project is the exhaustive completeness implied by the presentation of the color space. In presenting the color space in this way, Auerbach creates a sense of comprehensiveness about her treatment of color that orients the viewer inwardly, into the piece itself, rather than outwardly, on

how it might be extended. This kind of approach creates a feeling of the gestalt of the area of inquiry that I think generates a particularly engaging viewing experience.

Similarly, I attempt to create a viewing experience in which one focuses intently on a microcosm and on the inner workings of the system explored in the art work, though in my case I do this by a careful presentation of the relationship of parts to a whole. By laying out the intricate workings of a system of data, especially how elements are distributed in spatial and conceptual relationships, I create complete microcosms out of data. In this way, I attempt to straddle the analytic and the poetic, creating a lyrical experience of analytically derived imagery.

Stitched viewpoints: *Archeological Charts*

The second component of my thesis exhibition is a series of stitched maps called *Archeological Charts*, which differs from the other two pieces in the show in not being about language. In this case, I take the amateur's position and attempt to sort and categorize an unfamiliar area—objects from the distant past. Having created several projects about language—a system I know in detail—has given me the tools to analyze other systems and to recognize patterns and explore them visually without analyzing them deeply. For *Archeological Charts*, I have taken images from books and journals about archeology and selected similar items, not on the basis of their time or place of origin, but on their physical similarity and the responses they evoke: of the mystery of

odd miscellaneous artifacts, of the allure of semi-birdlike forms on vessels, of the complex organization of floor plans of unfamiliar dwellings. One piece represents the outlines of ancient oil lamps (fig. 7); another arranges various small objects (fig. 8); the third shows an archeologist's plan of a dig site (fig. 9); the fourth presents various views of the cross sections of clay vessels (fig. 10).



Figure 7: *Oil Lamps, Vessels*, detail (2013); photo: John Carlano



Figure 8: *Various Objects*, detail (2013); photo: John Carlano

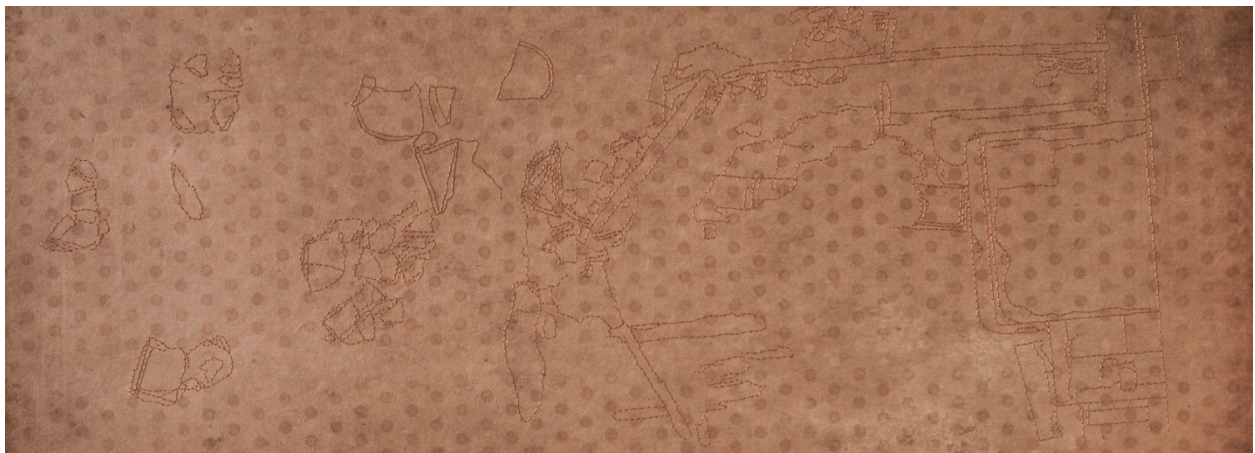


Figure 9: *Plan of Dwelling* (2013); photo: Erin Paulson



Figure 10: Cross Sections of Clay Pots, detail (2013); photo: Erin Paulson

In each case, I selected one of the various ways objects are visually represented by archeologists, using these shifting view points as another way to arrange, group, and sort objects as elements in a complex system. Each of the stitched drawings or maps is presented as a framed page (fig. 11).



Figure 11: Installation view of *Archeological Charts* series; photo: John Carlano

The paper used for this project is thick handmade paper from Korea, dyed with *kakishibu*, or fermented persimmon dye. Each sheet has a different color on the pale tan to pinkish brown spectrum and a different pattern of surface marks. This, together with the long, horizontal format of the page, provides a landscape-like surface reminiscent of an archeological dig. For this project also, I use stitching as a technique. Whereas in *Conversations in Syntax* the thread primarily represents the connective tissue of our language capacity (inherent connections, whether we always see them or not), in this project the thread represents an attempt to assign connections (an external attempt to assign order). Together, these two approaches represent both sides of the thread-as-

connection metaphor: cases where the connection is inherent and cases where the connection is assigned from the outside.

The process for arriving at the images and arrangements for this piece was a very different one from the work relating to language. In the case of the language-related pieces, a great deal of my process involves analyzing sentences as a linguist and simultaneously extracting visually strange and beautiful spatial relationships. For this project, I started from the appeal that certain kinds of ancient objects seen in museum cases have for me. I have long been drawn to small, odd bronze objects that are the accidental survivors of eons of history. I prefer to imagine their purpose and provenance rather than to learn about what archeologists know about them. For some reason, mysterious artifacts, like fireworks, the ocean, and a handful of other odd or wondrous phenomena, resist a need for analysis or explanation for me. These kinds of objects, and the imaginings they evoke, are a counterpoint to the more rigid analysis and organization that I find and create in other areas of my life, such as I found while working on the scientific study of language.

Because this series does not originate from an analytical approach, it is easier in this case to separate out what the stitching contributes. Here, as in the previous piece, precision is what drew me to stitching as a technique. In this case, though, it does not reflect the content of the subject matter but a pure pleasure in the way careful, small,

precise line segments can be used to build up the silhouette of a form. I am equally drawn to both the regular, ordered fronts of the pages and the messier, though still precise, backs of the pages. Each piece in *Archeological Charts* is displayed in a frame with glass on both sides and mounted on a pedestal. It is this interest in both sides of the page that draws me to the use of paper as the matrix for stitching rather than fabric. With fabric, there is a long history of hiding the backs of embroidery. To me, it is as important to see the backs of my stitched plans and diagrams as the fronts (fig. 12, cf. fig. 7).



Figure 12: *Oil Lamps, Vessels verso*, detail (2013); photo: John Carlano

In the case of *Conversations in Syntax*, this is because the piece is about the mechanics of how language works and revealing how the stitches are constructed echoes this focus on the inner workings of the sentences. For *Archeological Charts*, revealing both sides of the drawings and maps suggests the layer-by-layer revelation of the past in the process of archeology. It also suggests that what we see in the museum case represents a polished version of the messier remnants that come out of the earth—a kind of coherent story made from fragments of many pieces of stories.

There are many artists who use embroidery to depict the mapping of places, some of which have the expected features and look of maps. Artists like Liz Cueneker, Saskia Jordá, and Annie Coggan Crawford explore the form of the stitched map in different ways—installation, furniture coverings, hanging pieces—but they share an aesthetic of maps with recognizable forms such as street plans, garden designs, and recognizable state border outlines, using the maps primarily as a cue to social or historical readings of their content. That is, this genre of embroidery work uses maps as codes for ways of understanding cultural issues, rather than as maps to represent the outcome of a mapping process. One way that my work differs from this kind of work is that I am interested in developing systems for charting and plotting information (in the case of my work on language) and for expressing different slices of information (in the case of *Archeological Charts*) rather than in presenting images that have the expected

features and look of maps. My work is more concerned with the process of mapping than the resulting look of a traditional map.

An artist who does use the concept of mapping (as opposed to simply maps) in embroidery work is Jessica Rankin. Her work uses embroidered text and overlapping, diagrammatic forms stitched into layers of light, transparent fabric as a way to investigate what she calls “brain maps” (MoMA PS1.org) (fig. 13).

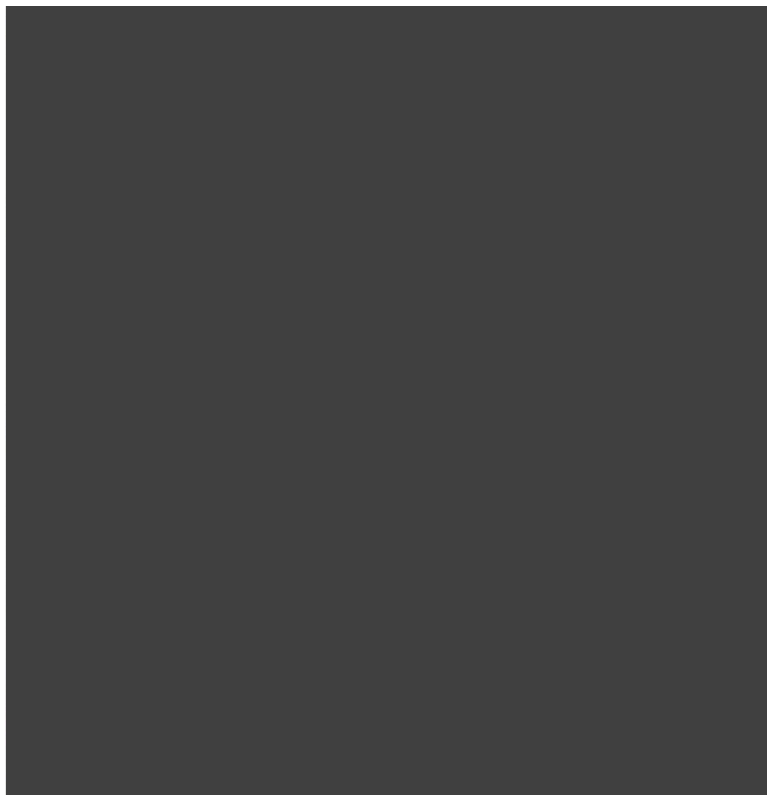


Figure 13: *Nocturne*, Jessica Rankin (2004); photo: momaps1.org

As described in *Contemporary Textiles*, “Her work is built from layers and layers of delicate fabrics, cartographic forms and poetic embroideries, giving rise to an otherworldly, hazy visual world that is at once beautiful and thought-provoking. ...

[S]he draws upon cartography, astronomy and genetic mapping as sources of inspiration" (Monem 68). From these sources, she creates images that explore connections between ideas, symbols, and texts, resulting in representations of networks of ideas (fig 14).



Figure 14: *Lunar/Effigy*, Jessica Rankin (2006); photo: artaustralia.com

In a review of Rankin's show at White Cube in London, Sarah James writes, "Rankin has said that 'sewing has a longevity, a resonance, it requires an ongoing relationship that reflects the random, repetitive motion of a word in your head'" (127). This observation resonates with me in the way that repetitive motions echo building blocks of complex systems, built up into an image through the long process of stitching. James goes on to critique Rankin's work for being too flimsy and argues that,

Perversely, while Rankin believes that in embroidery she has found her ideal metier, it seems to take away from her work as much as it gives. ... [L]acking the weight of canvases, the layering of ordandy doesn't make their forms 'reverberate,' but rather cheapens their impact" (127).

This critique seems to be as much a criticism of her materials and technique—organdy and stitching—as a specific criticism of Rankin’s work. Unlike other traditionally feminine techniques such as knitting and lace making, which have become very successful and accepted techniques by artists such as Dave Cole and Piper Shepard, embroidery seems to lag behind in acceptance by the mainstream art world.

For me, working with embroidery on paper is a way to explore the technical and conceptual properties of thread piercing and connecting the two sides of a rigid plane without being quite as firmly entrenched in the traditional feminine, domestic associations of embroidery on fabric. The thread connects one side of the surface to the other and makes a continuous line into discrete line segments running over, through, and under a plane. In this way, the mark of the drawn thread becomes three-dimensional (or at least creates two two-dimensional drawings, front and back) in a way that a drawn pencil line does not. I also choose to stitch into paper rather than fabric because paper brings along with it the idea of the page, which carries cultural connotations of reading, inquiry, and the distilling of information, ideas which are relevant to my work about both language and archeology.

Lexical Maps: *After Ptolemy*

The third and final component of my thesis exhibition, entitled *After Ptolemy* (*Geographia book 1, paragraphs 1–6*), is a six-piece installation of large silk panels hanging from the ceiling (fig. 15).



Figure 15: *After Ptolemy* installation shot (2013); photo: John Carlano

This work takes a section of the 2nd century A.D. text *Geographia* by Claudius Ptolemy, the only cartographic text surviving from antiquity, as its textual source. I also used this text as a source for another project during my first year of the MFA program and have found it to be particularly resonant with my interest in mapping language. Though we now know much more about the size of the earth and its relationship to the heavens than was known in Ptolemy's time, his focus in the work is essentially quite modern and relevant to my interests. This text is both a treatise on how to map the world (involving, among other things, improved projections for mapping the globe onto a

planar surface) and a philosophy about the way cartography differs from other ways of depicting a place, such as drawings of local features. The scientific, instructional function of this text is suggested by an alternative title provided by J. Lennart Berggren and Alexander Jones, translators of the version of the text that I used: *Guide to Drawing a World Map* (Berggren and Jones 4). My piece *After Ptolemy* is about (part of) the text of *Geographia*: it is a kind of map of the text, which is itself about the hows and whys of mapping of the world (see Appendix for Ptolemy's text).

This piece differs from *Conversations in Syntax* in taking a literary/scientific text rather than conversational language as a starting point, as well as focusing on a different aspect of the language system. One challenge for me in making visual work about language is that I am primarily interested in representing the rules of a language that are known implicitly by all native speakers, rather than in focusing on any particular, actual example of spoken or written language. It is extremely difficult, however, to represent language without using particular, actual sentences, each of which necessarily brings its own content and implications. Whereas in *Conversations in Syntax* I tried to avoid this problem by choosing arbitrary sentences, for *After Ptolemy* I chose a text whose content about the procedure of mapping provided a starting point to use cartography as a visual metaphor.

After Ptolemy consists of six large panels of silk (approximately 4' x 6') that each contain two separately printed pieces, one forming a top half, the other a bottom half. On the upper part of each panel is printed a two-colored representation of diagonal lines emanating from three points distributed around the panel (fig. 16).

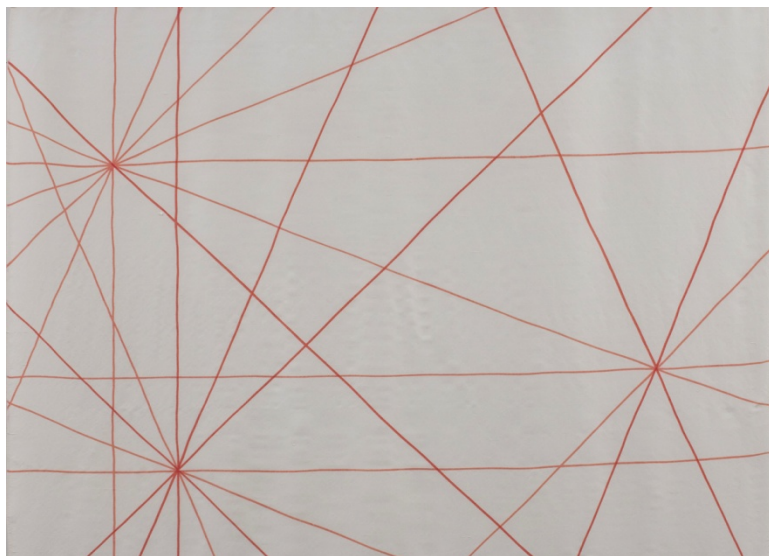


Figure 16: *After Ptolemy*, detail (2013); photo: John Carlano

These lines echo the rhumb lines that are found on old navigational maps radiating from multiple compass roses arranged around a “hidden circle” in the center of the map (fig. 17). Rhumb lines first appear on portolan charts of the 13th century, the period when magnetic compasses were introduced into Europe. The exact relationship between the use of the compass and the rhumb lines is not known, but the lines “form a regular pattern of bearing lines [that] are useful to navigators at sea” (Pflederer 22).



Figure 17: Portolan Chart of Mediterranean, 30cea/1586, Bienecke Library, Yale University; photo: Yale University libraries

I chose to use a pattern suggesting rhumb lines both because of the visual reference to charts and maps and also because the lines provide a sort of grid without the strict rectilinear layout of a grid that only has right angles. Since the lines are printed with dyes and thus integrated into the fabric itself, the panels retain their natural drape and thus reference both flags and large nautical maps with functional and ceremonial uses.

The bottom half of each panel contains a map (guide) of a text that was itself the guide (map) of how to map the known world for many centuries, with each of six panels representing a different part of Ptolemy's text. This part of the piece focuses on the lexical organization of the text. Each panel corresponds to a different paragraph of book 1 of *Geographia*, and each is printed with a range of related colors on part of the color spectrum (fig. 18a-f).



Figure 18 (a-f): *After Ptolemy*, details (2013); photos: John Carlano

I have sorted the text into parts of speech (nouns, verbs, articles, etc.) and assigned a range of colors to each category, with the particular hue and shade chosen by sorting each category into a continuum of similar to dissimilar words. Each word is printed as a solid rectangular box whose width corresponds to the number of syllables in the word.

The technique used for this piece is screen printing onto fabric with dyes, which, unlike pigments that sit on the surface of the fabric, become molecularly bonded to the material. Since I am generally drawn to luminescent, beautiful materials as a tool to complement and counterbalance highly analytical content, I chose to use a heavy-weight silk dupioni printed with acid dyes for this piece. One of the properties of printing with dyes is that, because of its integration into the molecular structure of the fabric, it can be seen equally on the front and back of the fabric, although the color can sometimes be different on each side because of the weave of the fabric. This aspect turns the planar fabric into a two-sided object, just as my treatment of stitched paper makes both sides equally important.

One of the appealing aspects about prints for me (including screen-prints on fabric) is their repeatability and potential for repeatability with variation. This aspect echoes the essential workings of language, which allows for fixed elements (words) to be repeated infinitely in certain variations allowed according to the rules of the syntax of the language.

In some ways this part of the project is the most analytical of my thesis work and in other ways it is the least focused on a single way of analyzing language. For *After Ptolemy*, I have constructed a system for the visual outcome of each word based on lexical category (noun, verb, adjective, etc.), word length, continuum of meanings, and

word order in an existing text. One aspect that I play with is the relationship between singular elements and a continuum—lexical categories are distinct, with a given use of a word fitting exactly one category (noun, adjective, etc.); whereas, semantic meanings exist on a continuum, with some word meanings being more similar than others. This project is a way of taking existing elements in a complex system and reanalyzing them, allowing for multiple ways of visually understanding the linguistic content based upon which aspect of the system one focuses on.

A highly analytical aspect of this piece lies in the technique used. For this piece, I mixed 150 separate colors of dye paste, a procedure that makes use of chemical equipment and careful measuring. Whether the laboratory-like procedures involved are evident to the viewer or not, what is clear is the sheer number of separate colors used to represent a relatively short text, thus referencing the way that texts and utterances are built up from many discrete lexical elements.

Each of these colors occurs 3-5 times within a panel, forming solid rectangular shapes whose width was determined by the number of syllables in the word represented. The hue and saturation of the color was determined by an evaluation of how lexical, versus functional, a word is—a functional word (*is, the, of*, etc.) primarily satisfies syntactic and morphological requirements of the sentence, whereas a lexical word (most nouns, verbs, and adjectives) has a more independent meaning. I assigned

hues furthest from the primary colors and the least saturated colors to the more functional words. The rectangles have a tall, skinny format and are arranged in long rows with a justified left edge and a ragged right edge, all of which contributes to the impression of a page of printed text. To print the word-boxes, I used several screens with rectangles of different widths, moving them around the page in order to build up the printed image. This is a use of printmaking technique that seems to me especially appropriate for work about the language system: rather than creating multiple copies of a single image, for this project I used printmaking to iterate a small number of elements into larger groupings, much like how words are arranged into phrases.

For me, the color mixing is an exercise in precision as much as the printing and processing of fabric or the embroidery-on-paper projects. I think this kind of precision, combined with luxurious materials like silk fabric, handmade paper, and silk thread, reflects my impressions of complex systems as elegant and precise microcosms. Sorting, grouping, and re-sorting of the elements in a system can be a way to tease out configurations already present or to assign new arrangements as a way to process and understand how the world fits together. My work reflects an interest in how we can take a system and be entranced and captivated by its patterns and organization even when its context is removed.

Another artist who engages with scientific concerns, both in his subject matter and in interpretation of that content is Josiah McElheny. McElheny was trained as a glass blower, and much of his work involves highly skillfully created glass objects. One such work is *Czech Modernism Mirrored and Reflected Infinitely* from 2005. This work consists of a museum-like display case containing eight lidded bottles, all made of a mirrored glass. The inside five walls, floor, and ceiling of the museum case are also made of mirrored glass, creating an illusion of the infinite regress of the mirrored bottles (fig. 19).



Figure 19: *Czech Modernism Mirrored and Reflected Infinity*, Josiah McElheny (2005); photo: www.artsjournal.com

This effect is both frustrating and entrancing, as one alternately tries to get a visual grasp on the bottles and relaxes into a meditation on the infinite. The work represents visually the idea of the infinite, one that is central to mathematics and certain branches of science, but which is notoriously difficult for the mind to comprehend. As one slips between attempting to see the bottles and following the line of their receding

reflections, one is visually grappling with a scientific concept that seems like it should be impossible to represent in the finite realm of art.

This visual representation of such a central and complex phenomenon resonates with me because knowledge of linguistic structure is not an easy concept to grasp. Syntactic rules and patterns are central to our use of language and, as such, underlie much of the way we conceptualize the world, but they are also part of our subconscious or tacit knowledge of language. To consciously investigate this system requires noticing patterns that are ordinarily taken for granted, and, thus, the study of language can resist representation, especially visual representation, as much as a mathematically wonderful and strange concept like infinity.

My work has further parallels with McElheny's in the setting up of visual correspondence systems as a way to map out scientific data. His 2008 piece *Island Universe* consists of five extremely intricate, large chandeliers of glass (fig. 20).



Figure 20: *Island Universe* 2012 installation at ICA/Boston, Josiah McElheny (2008); photo: Boston Globe

Each chandelier represents a different possible way the universe could have expanded from an origin point. This piece originated with an interest on McElheny's part in the chandeliers created by Hans Harald Rath in the 1960s for the Metropolitan Opera House in New York. After archival research at the Viennese company where Rath worked and in consultation with astronomical theorist David H. Weinberg, McElheny designed and created a remaking of Rath's chandeliers on what McElheny explains is a "scientifically accurate view of the Big Bang" (Gouch 35). Specifically, the piece makes visual the ideas of Andrei Linde, who championed the multiverse hypothesis of the Big Bang Theory. In the catalog essay for this piece for McElheny's recent show at the Institute of Contemporary Art in Boston, Taylor Walsh explains,

Rather than conceiving of the universe as a singular entity with a known point of origin, Linde proposed the simultaneous coexistence of multiple universes, each taking a particular shape and covered by unique properties. ... Five such

possibilities are depicted in McElheny's installation, each a reasonably accurate visual rendering of that which eludes representation. The sculpture's constituent parts encode astronomical realities, with the length of the rods signifying the age of the celestial bodies they support—handblown glass globes and disks for clusters of galaxies, lightbulbs for quasars (86).

The center of each chandelier represents the origin point and time of that particular universe, while the ends and bulbs represent the present time and degree of expansion of that universe. This work makes visual a deeply complex scientific idea by setting up a rigidly-adhered-to correspondence between entities in Linde's theory and physical, visual components in the art object.

My work also makes use of correspondence systems to map out the way different parts of the linguistic system work. I use different colors to represent specific components and different marks to represent higher order categories. I believe that this kind of correlative approach to the visual portrayal of information that McElheny and I have in common does two things: it presents a complex system in a way that allows viewers to draw conclusions and make connections of their own. It also, by the choices made the artist, presents his or her own visual analysis of the data. This balance between presenting a particular view of the information involved and allowing the viewer to draw his or her own conclusions is sometimes tough to strike. When

achieved, however, I think it can reveal much and contribute new ways of understanding the science involved as well as the visual relationships presented.

Conclusion

My work is concerned with the process of mapping or charting information. It straddles a line between actually conveying relationships within the data used (something that a real map, graph, chart, or diagram might do) and setting up visual correspondences that allow the viewer to extract his or her own visual patterns and references. The half-functional, half-lyrical result mirrors the process of creating the diagrams and charts for me: as I developed systems of diagramming language, I was constantly asking myself both whether the system was satisfactorily accurate regarding the linguistic relationships conveyed—as far as I knew from my knowledge of Linguistics—and whether the system was visually compelling.

I have discovered that the process of making visual art which takes a body of data as a starting point allows me to explore an analysis of a complex system, while creating something that also draws on visual and aesthetic judgments. The constant demands for attention from these two areas has allowed me to be both more free and more rigorous in the pursuit of understanding each. For me, the pull between the cognitive and the visual turns out not to be a duality to be chosen between but rather a constant source of course-correcting adjustments in the creation of work that satisfies

both my intellectual and aesthetic demands. In the end, it is the tension between the two that allows me to create work that captures the appeal that complex systems hold for me.

Appendix: Text used for *After Ptolemy*

Claudius Ptolemy's *Geography*, book 1: "On the difference between world cartography and regional cartography," (trans. Berggren and Jones 57-59) (interpolations due to the translators)

World cartography is an imitation through drawing of the entire known part of the world together with the things that are, broadly speaking, connected with it. It differs from regional cartography in that regional cartography, as an independent discipline, sets out the individual localities, each one independently and by itself, registering practically everything down to the least thing therein (for example, harbors, towns, districts, branches of principal rivers, and so on), while the essence of world cartography is to show the known world as a single and continuous entity, its nature and how it is situated, [taking account] only of the things that are associated with it in its broader, general outlines (such as gulfs, great cities, the more notable peoples and rivers, and the more noteworthy things of each kind).

The goal of regional cartography is an impression of a part, as when one makes an image of just an ear or an eye; but [the goal] of world cartography is a general view, analogous to making a portrait of the whole head. That is, whenever a portrait is to be made, one has to fit in the main parts [of the body] in a determined pattern and an order of priority. Furthermore the [surfaces] that are going to hold the drawings ought to be of a suitable size for the spacing of the visual rays at an appropriate distance [from the spectator], whether the drawing be of whole or part, so that everything will be grasped by the sense [of sight].

In the same way, reason and convenience would both seem to dictate that it should be the task of regional cartography to present together even the most minute features, while world cartography [should present] the countries themselves along with their grosser features. This is because with respect to the *oikoumenē* it is the geographical placements of countries that are the main parts, [namely] the ones that are well placed and of suitable sizes [for a map], whereas

the various things contained in these [countries have the same relationship] with respect to [the countries themselves].

Regional cartography deals above all with the qualities rather than the quantities of the things that it sets down; it attends everywhere to likeness, and not so much to proportional placements. World cartography, on the other hand, [deals] with the quantities more than the qualities, since it gives consideration to the proportionality of distances for all things, but to likeness only as far as the coarser outlines [of the features], and only with respect to mere shape.

Consequently, regional cartography requires landscape drawings, and no one but a man skilled in drawing would do regional cartography. But world cartography does not [require this] at all, since it enables one to show the positions and general configurations [of features] purely by means of lines and labels.

For these reasons, [regional cartography] has no need of mathematical method, but here [in world cartography] this element takes absolute precedence. Thus the first thing that one has to investigate is the earth's shape, size, and position with respect to its surroundings [i.e., the heavens], so that it will be possible to speak of its known part, how large it is and what it is like, and moreover [so that it will be possible to specify] under which parallels of the celestial sphere each of the localities in this [known part] lies. From this last, one can also determine the lengths of nights and days, which stars reach the zenith or are always borne above or below the horizon, and all the things that we associate with the subject of habitations.

These things belong to the loftiest and loveliest of intellectual pursuits, namely to exhibit to human understanding through mathematics [both] the heavens themselves in their physical nature (since they can be seen in their revolution about us), and [the nature of] the earth through a portrait (since the real [earth], being enormous and not surrounding us, cannot be inspected by any one person either as a whole or part by part).

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Sarah Hulsey

Translational Cartography: Visual Investigations of Complex Systems MFA Thesis Image list



Conversations in Syntax (2012)
abaca paper, thread, letterpress, clamshell box
photo: Erin Paulson
(Fig. 1, thesis paper)



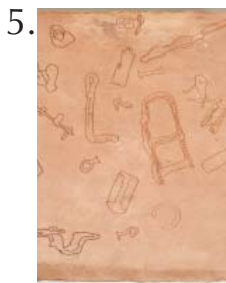
Conversations in Syntax, detail (2012)
abaca paper, thread, letterpress, clamshell box
photo: Erin Paulson
(Fig. 2, thesis paper)



Conversations in Syntax, detail (2012)
abaca paper, thread, letterpress, clamshell box
photo: Erin Paulson
(Fig. 3, thesis paper)



Oil lamps, vessels (Archeological Charts series) (2013)
kozy, thread
photo: John Carlano
(Fig. 7, thesis paper)



Various objects (Archeological Charts series) (2013)
kozy, thread
photo: John Carlano
(Fig. 8, thesis paper)



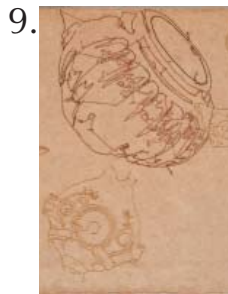
Plan of dwelling (Archeological Charts series) (2013)
kozy, thread
photo: Erin Paulson
(Fig. 9, thesis paper)



7. *Cross sections of clay pots, detail*
(Archeological Charts series) (2013)
 kozo, thread
 photo: John Carlano
 (Fig. 10, thesis paper)



8. *Installation view of Archeological Charts series*
 kozo, thread
 photo: John Carlano
 (Fig. 11, thesis paper)



9. *Oil Lamps, Vessels verso, detail*
(Archeological Charts series) (2013)
 kozo, thread
 photo: John Carlano
 (Fig. 12, thesis paper)



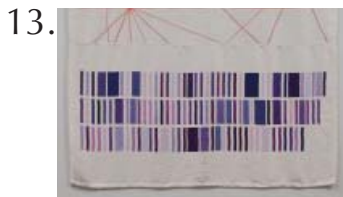
10. *After Ptolemy (Geographia book 1, paragraphs 1–6)* (2013)
 screen printing with dye on silk
 photo: John Carlano
 (Fig. 15, thesis paper)



11. *After Ptolemy (Geographia book 1, paragraphs 1–6)*
 detail (2013)
 screen printing with dye on silk
 photo: John Carlano
 (Fig. 16, thesis paper)

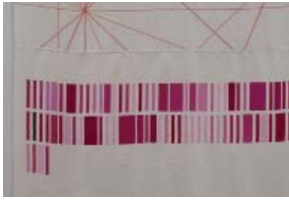


12. *After Ptolemy, detail* (2013)
 screen printing with dye on silk
 photo: John Carlano
 (Fig. 18a, thesis paper)



13. *After Ptolemy, detail* (2013)
 screen printing with dye on silk
 photo: John Carlano
 (Fig. 18b, thesis paper)

14.



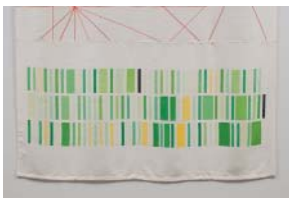
After Ptolemy, detail (2013)
screen printing with dye on silk
photo: John Carlano
(Fig. 18c, thesis paper)

15.



After Ptolemy, detail (2013)
screen printing with dye on silk
photo: John Carlano
(Fig. 18d, thesis paper)

16.



After Ptolemy, detail (2013)
screen printing with dye on silk
photo: John Carlano
(Fig. 18e, thesis paper)

17.



After Ptolemy, detail (2013)
screen printing with dye on silk
photo: John Carlano
(Fig. 18f, thesis paper)

Sarah Hulsey

Artist's statement, May 2013

I take elements in a system and carefully sort, arrange, and rearrange them as a way to elucidate complex phenomena and reveal patterns hidden within the data. As a former academic linguist, I have long been fascinated by the patterns and organizations of natural language and have come to focus on this as a source of input and inspiration. My work plots and charts systems of inter-related parts, including natural language and archeological findings, finding both rhythm and mystery in the way small visual elements assemble to represent complex wholes.

My work often integrates paper and fiber techniques, which attract me because the surface of paper and fabric offer the possibility of three-dimensional properties, which I highlight in installations that reveal both sides of ostensibly two-dimensional objects. I use handmade paper, stitching, and printing with dyes to investigate relationships between the analytical content and the lyrical outcomes resulting from the visualization of intricate systems.

Sarah McNearney Hulsey

sarah@sarahhulsey.com

Curriculum Vitae

Education

- 2011 – University of the Arts, Philadelphia, Pennsylvania
MFA candidate in Book Arts/Printmaking, expected graduation May 2013
- 2008 Massachusetts Institute of Technology, Cambridge, Massachusetts
PhD in Linguistics
- 2001 Harvard College, Cambridge, Massachusetts
AB in Linguistics, *magna cum laude*

Group Exhibitions

- 2013 ***Translational Cartography, MFA Thesis Exhibition, Book Arts/Printmaking,***
Rosenwald-Wolf Gallery, University of the Arts, Philadelphia, PA
- Tawney Continues: Fibers/Crafts and MFA Book Arts/Printmaking,*** Gallery 224,
University of the Arts, Philadelphia, PA
- 2012 ***PROG{WORK}RESS: A Work in Progress Show,*** Gallery 224, University of the Arts,
Philadelphia, PA
- A Shared Encounter: Printmaking at Hongik University and the University of the Arts,***
Hongik University, Seoul, South Korea
- About Unfamiliarity and Familiarity, Identifying Communication through Arts,*** Gallery
2, Korea Craft and Design Foundation, Seoul, South Korea
- Philadelphia Encounter,*** 175 Gallery, Korean National University of the Arts, Seoul, South
Korea
- Book Arts/Printmaking Program at the University of the Arts (USA): Student, Alumni,
and Faculty Books,*** Seoul International Book Fair, Seoul, South Korea
- WIP'd: Works in Progress,*** Gallery 224, University of the Arts, Philadelphia, PA
- One of Those Things,*** University of the Arts, Philadelphia, PA
- Beyond Language,*** Asheville BookWorks, Asheville, NC
- 2011 ***BiblioTech,*** San Francisco Public Library, San Francisco, CA
- Week One,*** University of the Arts, Philadelphia, PA
- 2009 ***Broadsided!,*** 23 Sandy Gallery, Portland, OR
- 2008 ***The Love Project: Love Lost, Love Found,*** Soulard Art Market, Saint Louis, MO

- 2006 *100 Years of American Poetry Broad­sides*, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, CT
- 2005 **Fourth International Book and Paper Triennial**, Center for Book and Paper Arts, Columbia College, Chicago, IL

Collections

Beinecke Rare Book and Manuscript Library, Yale University, New Haven, CT

Awards

- 2011 Scholarship to attend course, Rare Book School, Charlottesville, VA
- 2011 Nominated for Northeastern University Excellence in Teaching Award
- 2003, 2004 National Science Foundation Graduate Fellowship honorable mention
- 2002 – 2008 MIT Society of Presidential Fellows
- 2006, 2004 Work study scholarships, Penland School of Crafts
- 2001 – 2002 Henry Russell Shaw Traveling Fellowship, Harvard College
- 2001 David McCord Prize in the Arts, Adams House, Harvard College

TEACHING

- 2011 – 2012 Teaching assistant for University of the Arts classes: *Book Methods*, instructor Denise Carbone (fall 2011); *Relief/Monotype*, Professor Mary Phelan (spring 2012); *Papermaking*, instructor Winnie Radolan (fall 2012, spring 2013); *Fabric Printing*, instructor Catherine Abercrombie (fall 2012)
- 2009 – 2011 Lecturer in Linguistics Program, Northeastern University, Boston, MA
Classes taught: Introduction to Language and Linguistics; Seminar in Formal Semantics; Syntax; Topics in Morphology; Linguistic Analysis, Directed Study in Morphology
- 2008 – 2011 Instructor in Book Arts Program, Montserrat College of Art, Beverly, MA
Classes taught: Letterpress Printing I; Bookbinding I; Letterpress Printing II; Forms and Cultures of the Book
- 2007 – 2009 Adjunct Instructor in Linguistics, Northeastern University, Boston, MA
- 2004 – 2005 Writing Tutor for MIT course 24.906 *The Linguistic Study of Bilingualism*, Professor Suzanne Flynn (spring 2005 and fall 2005); Teaching Assistant for MIT course 24.900 *Introduction to Linguistics*, Professor David Pesetsky (fall 2004).

Related professional experience

- 2012 – Assistant to the Director, Catalyst Conversations, Art + Science in Dialogue, Somerville, MA
- 2012 – 2013 Intern, Fabric Workshop and Museum, Philadelphia, PA
- 2012 Co-curated (with Erin Paulson) show *Mary Smull: Manual Autonomy*. University of the Arts, Philadelphia, PA
- 2012 Post-graduate apprentice, Fabric Workshop and Museum, Philadelphia, PA
- 2012 Panel member, *Why Book Arts Now?* College Book Art Association conference, Mills College
- 2011 – 2015 Treasurer, College Book Art Association
- 2011 Panel member, *Form and Structure*, Northeastern University's Humanities Center, as part of *Considering Books* residency of artist Deborah Davidson
- 2010 – 2015 Member, Board of Directors of the College Book Art Association; Member Executive committee, Meetings and Programs Committee, Communications Committee
- 2009 Panel member, *Furthering the Critical Dialog*, Contemporary Artists' Book Conference, P.S. 1, New York City
- 2009 Presented paper "Linguistic Theory and the Book Arts," College Book Art Association Biennial Conference, University of Iowa Center for the Book