

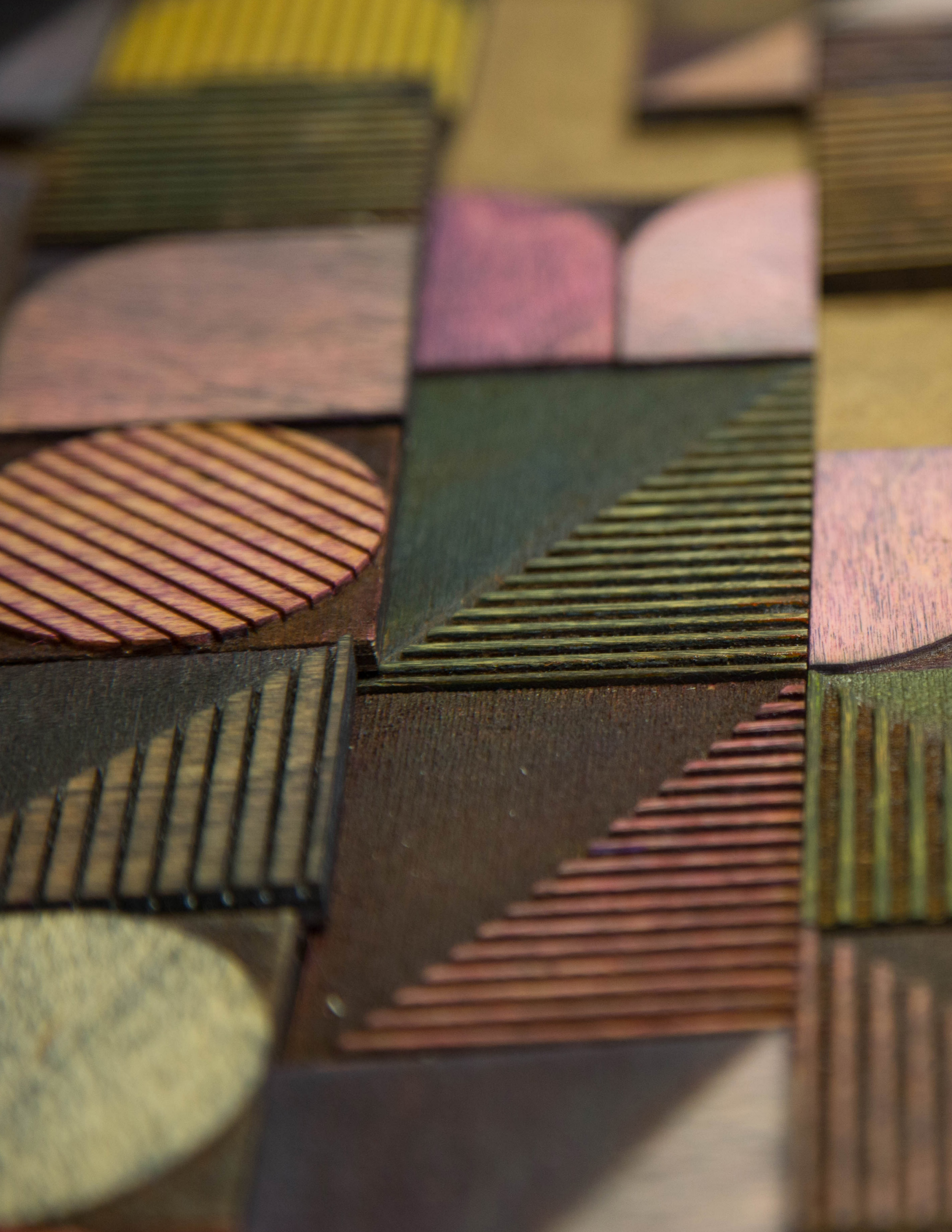
Puzzling

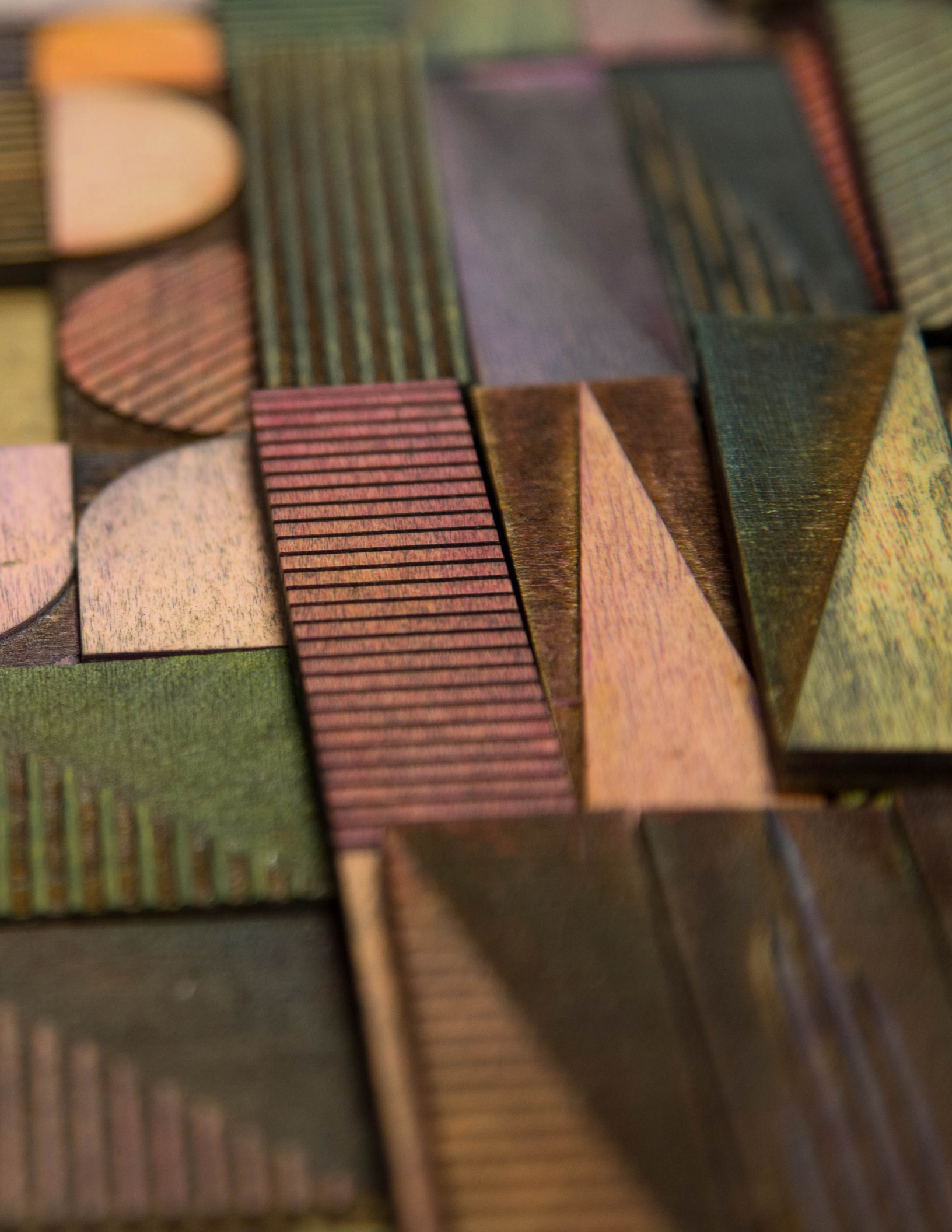
Jesse Warne

University of Central Oklahoma

Submitted in partial fulfillment of the
requirements for the degree
Master of Fine Arts in Design at the
University of Central Oklahoma

April 27, 2018





Photographs by Jesse Warne and Mark Zimmerman.

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Puzzling

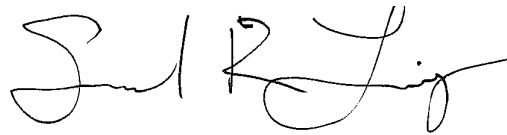
Jesse Warne
Master of Fine Arts

University of Central Oklahoma

Larry Hefner, MFA
Thesis Committee Chair:

A handwritten signature in black ink that reads "Larry Hefner". The signature is written in a cursive style with a large, prominent initial "L".

Sam Ladwig, MFA
Thesis Committee Member:

A handwritten signature in black ink that reads "Sam Ladwig". The signature is written in a cursive style with a large, prominent initial "S".

Mark Zimmerman, MFA
Thesis Committee Member:

A handwritten signature in black ink that reads "Mark Zimmerman". The signature is written in a cursive style with a large, prominent initial "M".

April 27, 2018



Abstract

Our interactions with letterforms are ever-increasing with the additions of new technologies and a more digitally connected society. Through stone tablets to papyrus scrolls, printed books to digital publishing, type finds new ways to reach our eyes. From the moment we wake up to the numbers and letters on our alarm clocks until the credits roll on the last show we watch before turning off the television to go to bed, typography follows us through nearly every moment of our day. Some instances maintain the formality of strict typographic usage while others exhibit an informality (although no less communicative) that feels almost primal. The way people interact with letterforms is constantly evolving, and typographers need to actively engage in exploring new approaches to type design and typesetting. This body of work serves as evidence of my human experience and the processes and methods of its creation serve as evidence of potential in future directions in letterform design.

While many working designers spend their professional days filling boxes with text, this work has been more inspired by designers who have disregarded the box, placed their box on the side of a subway car or used the box to chop text into pieces and start anew.

Editorial designer David Carson, artist Augustine Kofie, and letterpress abstractionist David Wolske have all influenced my thesis work. Carson's approach to communication opened a path to more creative exploration in how typography can be used to greater effect by breaking rules than by following them. Kofie's letterform inspired geometric shapes showed me that even the simplest of forms are capable of a powerful and dynamic aesthetic. Finally, Wolske's approach to utilizing older technologies in new ways demonstrated to me that there is much to be explored and drawn out of even the oldest of design tools.

As designing type has migrated to the digital realm over the last several decades, type designers have lost a physical connection to their work. In addition, letterforms and type systems have been constrained to the limitations of software and display systems. In order to bring letterform creation back into the hands of the designer, both literally and figuratively, I used a laser engraving machine to create a system of modular wood pieces with a wide variety of straight edges, curves, and diagonals that can be placed on a base in the bed of a cylinder letterpress. This modular system allows me to physically construct letterforms in the same environment in which they will be applied. The tangible artifacts that I created and interacted with over and over again taught me about the nature of certain materials and the wants and needs of inanimate objects. The act of creating all of these pieces of dissected letterforms that I could work with in the physical space of the press bed allowed me to gain a much closer relationship with and understanding of letterform design than I feel I could have gained behind the barriers of a digital screen and keyboard. Although the pieces of the system were initially

designed to work on a specific grid ratio, experimentation proved the ability to vary both the ratio and scale of the pieces. This allowed for greater variety and fostered creativity in the letterform design process.

This project spans the full cycle of deconstruction to creation. Beginning with the examination of the existing typographic landscape and the current practices in type design, I transitioned into exploration of how shapes form into symbols that can communicate information and aesthetic expression. By breaking down letterforms into their most basic geometric shapes I was able to establish a system of physical exploration that not only enables but promotes tangible interaction in the type design process. With the use of the letterpress as the vehicle for output the process has an association with the origins of modern typographic communication built into it, providing context for past and future directions in type design. Through the exhibition of the body of work in the environment in which it was created, I was able to demonstrate the mechanics of the system, the flexible nature of the process, and the potential for the final printed work to communicate and engage with society. The thesis project and exhibition were titled "Puzzling" to address the complexity of visual communication and the exertion over the solution for a new approach to modular type design and typesetting.

"I still appreciate beautiful letters and words, but I'm now more interested in discovering compositions through the deconstruction and never-before-imagined reconfiguration of letterform components. I want to create a new letterpress vocabulary."

David Wolske, personal communication,
September 16, 2017

Inspiration

Several artists' and designers' works have inspired my interest in exploring the possibilities of letterforms as a design subject. The common link between them all is that they each take a unique approach to the use or creation of letterforms, looking at them from new and fresh angles. While many working designers fill their professional days filling boxes with text, some designers instead choose to disregard the box, others place their box on the side of a subway car, and some chop the letterforms into pieces and start anew.

This theme of disruption is found driving the heart of graffiti, the art movement responsible for both my pursuit of design as a career and my choice of letterform design as an academic research subject. The last few decades have brought about unprecedented shifts in the typographic landscape with the explosion of the graffiti art movement. This anarchic movement, by its very nature has revolutionized communication structures and typographic orthodoxy. Born out of a self-expressive incentive, graffiti's goals, materials, context, and influences brought about a dramatically different world of letterform design. The youthful movement breathed an energy and complexity

into the landscape that is both empowered by and inseparable from the context of the environment in which it exists. This movement and its directions have grown and spread over time weaving an intricate tapestry of national, regional, local, and individual letterform design styles and traditions. The fluidity of this typographic method of self-expression is an undeniable influence in my interest in letterforms as a design subject. Graffiti's reimagining of how tools could be adapted for the purpose of letterform design is evidence of the effectiveness and viability of non-traditional materials and the potential of untapped applications. The graffiti movement established the concept of letterform as a tool of self-expression and the reflection of human experience. By graffiti writers putting their names on the sides of trains that were witnessed by many thousands of people they gained local and even international celebrity. Their letter styles, recognizable to those willing to observe, served as expressions of their persona and experiences. Their work is on display to the world as a testament to their desire and willingness to contribute their voice to the community. A demand to be recognized as a conscious and creative being in a society that might have otherwise forgotten them and looked the other way.

Graffiti as an art movement and subculture has spread throughout the world to nearly every continent. Its influence can be observed in countless areas of modern culture and society including fashion, graphic design, fine art, advertising, commercial products, industrial design, film, and politics. With its expansion across the globe, we can find many examples of local styles and adaptations. New approaches and techniques are disseminated through photographs, travelers, publications,

and the internet that are then reabsorbed into other cultures, recycled and further adapted by new generations of practitioners. It is a relatively recent art movement that is still evolving. These evolutions and adaptations are a testament of the need for letterforms to evolve to fit the communication and expression needs of human experiences.

Of specific interest to my thesis are the works of the futurism movement of modern graffiti commonly referred to as "Graffuturism," a style of abstracted geometric graphic art that has risen out of graffiti art culture. The style explores line, texture, color, form, and composition in a variety of mediums. This exploration is leading to intriguing new works that transcend conventional written communication. Although the work that falls under this genre varies greatly, much of it focuses on breaking down letterforms into their foundational geometric elements and explores using those geometric elements to create compositions that reflect dynamic and complicated modern experiences. The work of Augustine Kofie is a good example of this. With a background in graffiti, Kofie builds basic geometric elements into dynamic abstract compositions on paper, canvas, found objects, installations, and murals. I see Kofie's work as filling voids in the typographic lexicon. The goal for my thesis is to build a system that provides an access point to work in these voids in a way that utilizes these most basic forms in a for a wide range of compositional possibilities.

Also of influence is David Wolske, an artist and graphic designer who works with letterpress as a medium for creative, non-commercial printmaking. Wolske creates compelling abstract compositions with multiple printed layers of wood type, masking off sections of the letterforms to reveal their geometric origins. He is simultaneously taking them apart and making them something more. Wolske calls his technique “Isotype” printing. In explaining why he developed this process he says, “I wanted to deconstruct letterforms and obscure recognition without compromising the integrity of antique movable wood type. With this new method, I subvert literal interpretation by isolating and layering the vertical, horizontal, diagonal, and curved components of typographical forms” (Wolske 2018). Wolske chose the letterpress as his tool for creation for many of the same reasons I did, “I find it very satisfying to actively build and produce a design that occupies space, and through letterpress, I’m able to control the means of production, so I have ownership of my work from conception to completion. Another appealing aspect is that I’m creating a legacy of work that may be handled and enjoyed long after I’m gone and without technological assistance” (D. Wolske, personal communication, September 16, 2017). Although our processes are almost reversed, his way of approaching the letterpress as a creation space was a major inspiration for my choice to develop a type design system for application in this historical, mechanical process. The physical nature of the forms in your hand and relationship of the type, ink, and paper in the press foster a connection between the designer and the work that bridge the legacy of type design with possibilities of future explorations.

The editorial design work of David Carson with Ray Gun magazine in the early 90s was a battle against typographic constraints and their limitations on expressing the modern existence. As a storyteller and communicator, Carson refused to abide the "box" and laid type over imagery in a way that began to visually communicate the constant inundation of information we receive and experience in our daily lives. The work was interactive in a new way, not with the viewer so much as with all the elements on the page: story, headings, photos: all chopped up and reassembled into an experience that was a closer reflection of the subject than the editorial designs that had come before it. This was particularly true for the pop culture/lifestyle subject matter that Ray Gun was focused on. Carson's treatment of the type and letterforms gave us much more of the viscera of the cultural experiences. Readers could almost smell the cigarettes in the club, hear the car horns outside, and feel the cringe of awkward pause in the conversation; made possible through the disruption of typographic norms. To Carson, type was a malleable form to be shaped to best fit within and express the experience of the context it was reflecting, much like the graffiti movement had begun to demonstrate in the previous decade. I share this view with Carson and seek to bring this sense into not only the use of type but into its creation as well.



Field of Exploration

Letterform design is not a major focus of most graphic designers' academic or professional practice. Projects, more often than not, involve working with type designed by others. There are good reasons for this: designing letterforms and type is difficult and takes a great amount of time to do well. However, the process of designing type can build learning experience and should be viewed as an important part of the graphic design discipline. Most letterforms and type commonly used today were designed around the functionality of printing presses dating back to Gutenberg's first press in the late 14th century (Meggs 2006). Even modern electronic type systems and software are largely digital replications of these centuries old systems. Advancements in the quality and afford-ability of new technologies such as 3D printing, virtual reality, and laser engraving offer possibilities for designers to design and produce type and letterforms in new ways as well as expand the use of older technologies. New technologies are rapidly emerging in all areas of graphic design and can cause older technologies to be put aside and replaced. These new technologies often benefit the designer through increased efficiency, improved capabilities, or lower overall project cost. However, this can result in losing out on some of

the special subtleties that resulted from older techniques or technologies: the press of ink into the paper or the texture of well-worn type. The functionality of technical processes can also affect a designer's work, driving creative decisions towards what works best or easiest in a certain format or process. When new technologies are adopted and become standard production processes, so do the design practices associated with them. If designers are not careful we can begin to lose sight of why we do things in a particular way. If we learn or are taught to design according to a certain process we may never consider why those standards exist and how they were established.

By exploring older technologies and techniques, I have gained insight into how these standards were established and strengthened my future design decisions. Additionally, by designing new type for older technologies such as the letterpress, I gained a better understanding of what about a type design does and doesn't work, as well as a more holistic understanding of how letterforms work and interact with one another. To take this one step further, through a stronger grasp of the older technologies and techniques I am better prepared to adapt to future needs and directions in the field of type and letterform design. As Alexander Cooper stated, "Research into the positioning of the letterpress process within education is pertinent today, as there has been a marked shift in purpose from technical teaching to a tool for investigation and experimentation" (Cooper, 2013).

Attention must also be paid to how letterform design is approached within an evolving typographic landscape and its emerging needs. Social and cultural influences continue to evolve not only how letterforms are consumed and interacted with but also impact how letterforms are designed and utilized. However, letterforms for most modern languages haven't changed much in over 500 years. Through this thesis work, I explored how letterform design and output possibilities can be expanded with recent advancements in technology and utilized in combination with older technologies and processes, demonstrating that there are new ways of creating, consuming, and interacting with type.



Figure 1 - Hefner IGF Type Specimen

Process

Throughout my entire graduate study, I explored both letterpress printing and type design (Figure 1). In the Fall of 2016, I had a discussion with a member of my committee, Sam Ladwig, about how graffiti had influenced my desire to research and practice type and letterform design. Specifically, we were discussing the interlocking and overlapping nature of some graffiti lettering and some ideas of research possibilities began to emerge on how those letterform relationships and interactions differed from those in electronic type. I held on to this question, thinking for several weeks about this and began to question how some of these interlocking and overlapping characteristics could be applied in fonts and built into electronic type using type design software. However, due to its structure and limitations, current type design software just isn't built to work with type in the mode that I wanted to explore. I am not a software developer, so I decided to explore some other ways letterform designs could be created and applied outside of software constraints. In one of my prototyping attempts for a design for a digital type solution, I began to explore strongly grid-based letterforms in an attempt to enable strokes of consecutive letters to be shared.

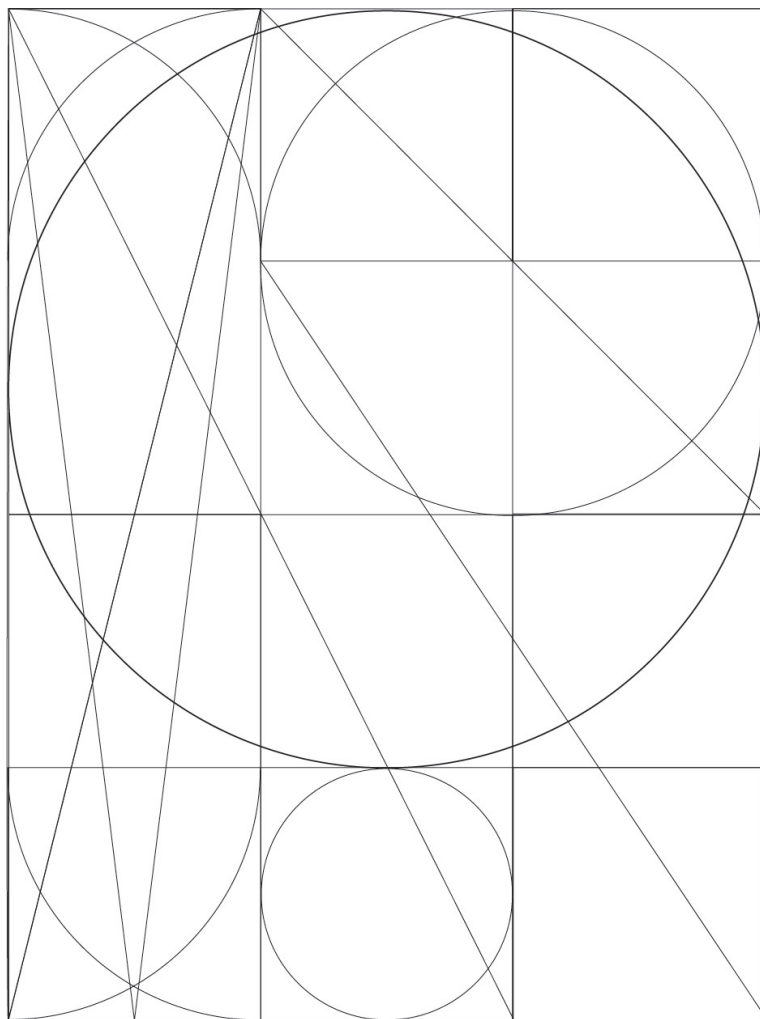


Figure 2 - Puzzle Type Design System grid

Following a design thinking workflow, once it became clear this wasn't the direction that would lead to an interesting solution, I let it fail quickly. However, I did see some interesting possibilities developing in the geometric shapes that were emerging from deconstructed grid-based letterforms. I realized that by dividing up a modular grid into a variety of geometric shapes I could create a system of pieces which I called the Puzzle system, that could be used to create a nearly infinite number of letterform designs. Due to each piece's grid-based origins, the pieces, despite variance in shape, hold a relationship and collaborative nature with one another. My previous work exploring new ways of creating physical type for letterpress printing seemed to be a prime avenue to pursue as a final application method for the modular type design system.

As designing type has migrated to the digital realm over the last several decades, type designers have lost a physical connection to their work. In addition, letterforms and type systems have also been constrained by the limitations of the software systems as well as how the type is rendered by the various electronic display systems. In order to bring letterform creation back into the hands of the designer; both literally and figuratively, I used a laser engraving machine to create a system of modular wood pieces with a wide variety of straight edges, curves, and diagonals based on dissecting a 3x4 grid (Figure 2).



Figure 3 - Puzzle Pieces

To allow for greater variety, some line patterns were added to different sets of the pieces (Figure 3). The added texture is a tool that can be used to control hierarchy, direct eye movement, change composition, and affect readability. When placed on a customized base in the bed of a cylinder letterpress, the pieces allow me to physically construct letterforms in the same environment in which they will be applied. This facilitates a fluid design process and permits rapid prototyping, testing, and refinement. The ability to create and adapt the type in the press is the strength of this system. Movable type is not a new concept, nor is modular type. In fact, it is quite easy to create modular letterforms in graphic design software using basic geometric shapes but the most common use of modular type is that which is designed to work within low resolution display systems such as digital clocks. Although the module pieces of these systems are capable of creating a variety of letters and numbers, they ultimately result in fixed and inflexible characters. Where I find the Puzzle system to have both creative and academic merit is in its ability to allow for adaptation of the shape and scale of characters within the press as they are being assembled and complete flexibility to transform from one design to another.



Figure 4 - Oklahoma City

Puzzling It Out

Puzzle was initially designed around a deconstructed 3x4 grid where each character would maintain a consistent width and height. Modules could be left out of counter forms or filled with any of the many pattern filled pieces to allow for control of hierarchy and readability. The first piece in the project was this "Oklahoma City" type poster design (Figure 4) as an homage to my hometown. Although many of the letters in the poster are highly stylized, I believe the rhythm and modularity of the poster overall, guides the viewer to relatively easy readability.

In an attempt to experiment with the potential boundaries of the system the next poster in the project was designed to test the scalability of creating letterforms beyond the original grid ratio and to see how the characteristics of letterforms might shift as the scale increased. The resulting "R" poster provided insight into the potential of the system to reflect the graffiti influences of the project's origins as well as the potential for the various patterns and textures to be a tool for directing eye movement and rhythm within a letterform (Figure 5).



Figure 5 - R





Figure 6 - Puzzle

It quickly became apparent that due to the modularity of the initial design the system permitted great flexibility in the scale of the grid ratio, allowing for easy transition in scale of the deliverable without a need to resize and remake the pieces for a specific project. However, I was curious if the pieces would cooperate with the tight registration needed to do multi-colored prints. Since multi-color printing in letterpress typically means multiple passes through the press, registration could be an issue with lots of little movable pieces. The "Puzzle" poster was designed to test the system through two color multi pass printing. Although the results were not completely accurate every time, the system showed that with careful planning and execution, multi-color printing was successful within reason (Figure 6).



Figure 7 - Be Kind

The next experiment with the system sought to reveal how the system would work when the size of the pieces was scaled up 400%. The pieces were cut out at this scale again with both solid pieces and pieces with similar patterns. The "Be Kind" poster (Figure 7) was designed and printed with the solid shapes in all lowercase to communicate a nonaggressive and personal message. A split fountain three color inking method further reverberated the message of inclusion and diversity implied in the text. This piece is evidence of the system's ability to form type that effectively communicates to viewers without a need for decoding shapes into letterforms and words. This piece sold out at the exhibition and there were also numerous requests for an additional run of prints. This tells me that people not only connect to the design but the system is clearly successful in communicating effectively and engaging an audience.







Figure 8 - Blackbird

Having felt the system was working at this 400% scale, I wanted to explore how else its use could be expanded outside of letterform design. I began with exploring an abstract design for use as an art print or background element in a multi-layered print. While laying it out I noticed parts of the composition resembled a bird or some type of animal. After reworking the composition into various forms I settled on what I title "Blackbird" (Figure 8). In addition to being well-received by many at the exhibition, this piece was also accepted to the New Impressions 2018 show at the Hamilton Wood Type & Printing Museum, Two Rivers, Wisconsin. New Impressions is an international, juried exhibition showcasing exploration and creativity in letterpress printing with work on display from 44 artists in 9 countries. The piece will be on display at the Hamilton Wood Type & Printing Museum from April 17 to June 30, 2018, with a gallery reception on June 16, 2018, after which it will be housed in the museum's permanent collection. A series of five prints will also be available for purchase through their online store. With the selection of this work into a show at such a historic venue amidst an international pool of talent solidifies my resolve that this modular system has merit and is worthy of academic and creative pursuit.





kind



kind



OG



Artist
Title
Medium
Date

Thesis Exhibition

On April 26th, 2018, the exhibition took place at the University of Central Oklahoma's Letterpress and Prototyping Lab to showcase the body of work. Printed work and the Puzzle modular type design system were on display. In addition, there was an opportunity for guests to use the type system to print a poster themselves on a letterpress to help build an understanding of the process and increase engagement. The presentation of the work was divided into four sections: selected works, process, physical components of the system, and the interactive printing station.



Figure 9 - Displayed Framed Work

The Work

As guest entered the exhibition they were greeted with a 25 foot wall (Figure 9) showcasing ten framed pieces that features some of the work I felt were the most successful as well as an artist statement. In addition to the framed pieces there was a four panel display of unframed work exhibiting a variety of pieces and color variations. By displaying both framed and unframed work I was able to provide opportunities for a greater spectrum of potential collectors and make the work available to people on a range of budgets. The work was well received by all those that I spoke to and over a dozen pieces were sold, including both unframed and framed works.



Figure 10 - Process Wall



The Process

This wall (Figure 10) displayed the versatility of the type design system and my printing process. The modularity of the physical pieces allowed me to create the letterforms and compositions in the press itself. This gave me the ability to rapidly prototype, test print, and make revisions. These revisions included changes in ink color, paper, or letterforms; or alterations to entire compositions. The top row consisted of the initial designs and below were examples of the corresponding evolved version.



HAMILTON
MFG. CO.

HAMILTON
MFG. CO.

HAMILTON
MFG. CO.

ELT. WIDE

PUZZLE

BROOKLYN 10-LINE/120pt
BROOKLYN 10-LINE/120pt
GOTHIC 12-LINE/144pt
GOTHIC 12-LINE BLD/COND
HAMIL 12-LINE
HAMIL 12-LINE

Figure 11 - Puzzle System in Type Case

The System

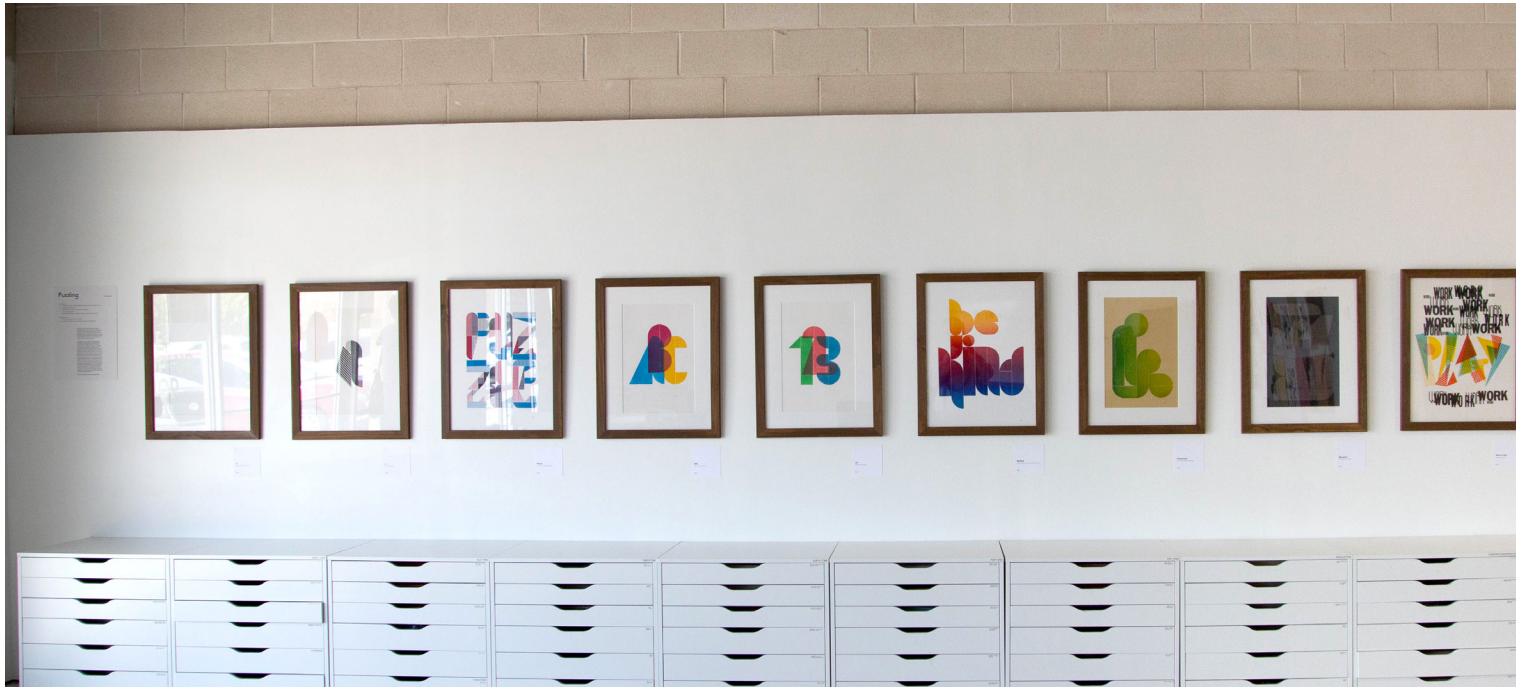
The physical pieces of the system as well as the base that brings them to type high were displayed together (Figure 11) in a type drawer on top of a type cabinet to provide context with the system's relationship with traditional wood and metal type for letterpress printing. Guests browsed the variety of shapes and textures of the pieces while gaining a tactile understanding of how the pieces could be used in arrangement of a composition. Several pieces were also loosely laid on the base plate in the case spelling out "type show" so that guests could see the letterforms must be composed in reverse in order to read correctly after printing. This display was also used several times in discussions with guests as I explained my design process and allowed me to swap out or reorient pieces for demonstration purposes.



Figure 12 - My Mom Printing a Poster with Printing Assistant Billy Muschinske

The Making of Things

Upon entry guests were provided a ticket allowing them to print a complimentary poster utilizing the system. The design was preset in a letterpress for continuity but guests were allowed to print the poster themselves with the help of a print assistant (Figure 12). This seemed to be a fun activity of guests of all ages with several kids getting their first letterpress experience and allowing everyone who wished to try their hand at using the system. This also ensured no one left empty handed if they couldn't afford to purchase a print that day. The tactile artifacts of letterpress printing are a major reason why I chose to work in this medium for my thesis project so it was important to me for people to have an experience interacting with the process as well as something they could take with them. While not everyone chose to take advantage of this opportunity, many people did. An average of one per group for a total of 35 guest-printed posters.





“Virtually all of the greatest type designers and typographers, going back to Gutenberg, Schoffer, and Jenson were trained in one of the two-letter craft traditions, either calligraphy or cutting letters in metal. Such historical evidence gives credence to Tschichold’s belief in hand work for mastering spacing - the essence of graphic design - along with the accompanying understanding of letter form.”

Lance Hidy, 2007

Conclusion

Designing letterforms and type is difficult and takes a great amount of time to do well. However, it can build strong experiential learning experience and should be viewed as an important part of the graphic design discipline. Attention must also be paid to how letterform design is approached within an evolving typographic landscape and its emerging needs. Social and cultural influences continue to influence not only how type is consumed and interacted with but also how letterforms are designed and utilized. As type designers we should embrace ways to evolve how type is created and applied as well as reduce or eliminate constraints that may hinder effectiveness.

Historically speaking, type has been thought of in three ways: as line (as with writing), as shape (as with movable type), and as modules arranged into lines or shapes (as with dot matrix printers and LCD displays like calculators). Calligraphy extends line into shape. Digital manipulation of vectors in graphic design software expands the possibilities of shape into electronic movable type. This thesis work has taken a new approach with the idea of the arrangement of modules into shapes as an open system of type design.

Puzzle as a system opens the possibility for myself and others to explore ways of expanding letterform design possibilities without constraining what any specific character glyph should or must look like. There are no predeterminations of what a Puzzle "A" or "f" looks like. The system's possibilities are further increased by there being no limitation of where one character ends and another begins. As a designer using Puzzle, I am free to let characters share modules as ligatures would share strokes, without them having to be predetermined or limited by a glyph palette. Through multi-pass printing, modules can be removed, added, or replaced giving the system the ability to create depth and give the appearance of characters or features moving in front of or behind one another as multiple colors mix and/or overprint. This has enormous potential for future research and exploration as it opens up a third dimension to letterform relationships.

Future research potential also exists in pushing the scale of the modules to both larger and smaller sizes to find breaking points where it is no longer viable. As I discovered rather quickly because of the modular structure, the system lends itself very easily to different grid ratios. Potential experimentation exists with how grid variation affects letterform characteristics. It would also be very interesting to see how other designers use the system. Finding other type designers that would be willing to use the system and collecting samples of their results could make for an interesting group show and/or potential publication.

Both the exhibition and the years of work leading up to it have given me countless lessons that I never could have anticipated or planned for. Constraints in everything from time, material properties, equipment, software capabilities, and mechanical processes offered a plethora of experiential learning opportunities. Though these challenges sometimes left me feeling like a boxer taking relentless shots on the chin, in hindsight they were a driving force in design decisions that helped shape the project and its final outcomes. If I hadn't run into insurmountable limitations in type design software and compatibility, I would have likely been driven in a much more; if not exclusively, digital realm of exploration. Although I certainly would have had valuable experiences on that path, I don't know that I would have developed as deep an understanding of the potential of a more open system of type design. The tangible artifacts that I created and interacted with over and over again taught me about the nature of certain materials and the wants and needs of inanimate objects. The act of creating all of these little pieces of dissected letterforms that I could work with in the physical space of the press bed: put down, take up, rotate, swap out..., allowed me to gain a much closer relationship and understanding of letterform design than I feel I could have gained behind the barriers of a digital screen and keyboard.

References

Cooper, A.; Gridneff, R.; Haslam, A., (2013). Letterpress: Looking Backward to Look Forward. *Visible Language*, Pages 52-72.

Hidy, L.; (2007). Calligraphy and Letterpress in Design Education. *Printing History*, Pages 3-14.

Meggs, P., & Purvis, Alston W. (2006). *Meggs' history of graphic design* (Fourth ed.).

Wolske, D. (2018, September 16). Email Interview