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Inspecting Traditions

By

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A Thesis Submitted in Partial Fulfillment of the Requirements for the

Degree of Master of Fine Arts in Ceramics

School for American Crafts

The College of Art and Design

Rochester Institute of Technology

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Abstract

In this paper I examine my thesis body of work, *Inspecting Traditions*. This paper illuminates my process of making Jewish objects through the use of digital fabrication techniques. The work in *Inspecting Traditions* uses historically Jewish forms as a lens in which to speak about the history of ceramics and its relationship to 21st century technology. This work developed a dialogue between the historical sources and modern technology by using 3D printing to create vessels.

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The goal of my thesis body of work, *Inspecting Traditions*, was to add to the discussion around the question of what Jewish art is. In it, I explored how 21st century technology answers that question using a self-imposed, antagonistic relationship between modern technology and religion. I used historically Jewish forms as a tool to discuss the history of ceramics and its relationship to 21st century technology. My goal was to examine traditionally Jewish objects using digital fabrication techniques. A dialogue was developed between the historical sources and modern technology by using Computer Aided Design (CAD) and 3D printing to create vessels. In this paper, I will explore: the relationship between Jewish art and Jewish history, Judaism's spiritual relationship with ceramics, Futurism's understanding of the lack of Jewish art, and the definition of Jewish art.

The Jewish religion has a history rich with utilitarian and ritual vessels. Documents elaborating on the development of the religious laws concerning these vessels have withstood the test of time since being canonized in 200 C.E.¹ Although we have written records of the spiritual aspects, we do not have a physical record of the development of these vessels. Throughout history the Jewish people have been persecuted by world powers preventing a lasting physical record. Persecution took the form of genocides such as The Great Revolt by Rome in 66-77 C.E.,² the Chmielnitzki Massacres by Ukraine in 1648-1649,³ and the Holocaust by Germany in 1941-1945.⁴ They also came as expulsions, especially between the thirteenth and eighteenth centuries, such as those by England, France, Hungary, Austria, Germany, Lithuania, Spain, Portugal, Bohemia, and Moravia.⁵

It is harrowing but not unsurprising to know that only about a dozen Jewish ritual objects survive today from before the 17th century. Artistic development started at this time resulting in Baroque becoming the main stylistic source in Jewish forms. The Baroque art style, "because of its humanistic inheritance from the Renaissance, brings the heavens down into the terrestrial orbit in manifestations of glory and splendor."⁶ This mirrors the Chassidic philosophy developed in the late 17th century by Rabbi Shneur Zalman of Liadi which he crystalized in his book *Tanya*.

¹ Joseph Telushkin, *Jewish Literacy: [the Most Important Things to Know about the Jewish Religion, Its People, and Its History]*, (New York, NY: Morrow, 1991), 149-153.

² Telushkin, 133-136.

³ Telushkin, 208-9.

⁴ Telushkin, 358-359.

⁵ Telushkin, 189.

⁶ Kayser, Stephen, and Guido Schoenberger, eds. *Jewish Ceremonial Art*. (Philidephia, PA: Jewish Publication Society of America, 1955), 9

There, he explains that the reason of human existence is to bring down godliness from heaven by performing acts of love and kindness in this physical world.⁷ This philosophy was the starting point in my journey into observing Judaism. As I learned more about my religion, I found that there were religious texts speaking about utensils and how they become ritually impure. A bulk of these texts describe in detail a variety of unique earthenware vessels used in daily life for Jews thousands of years ago.

Judaism is based around two different categories of texts: the written law and the oral law. We believe both were given on Mt. Sinai to Moses from Gd, with the written law being immediately written down as the Torah. Oral law, explanation and elaboration of the written law, was canonized as the *Mishna* by Rabbi Judah the Prince in around 200 C.E. This served to prevent the loss of knowledge after two genocides, the Great Revolt and the Bar-Kokhba rebellion (132-135 C.E.), which resulted in the death of over a million Jews. The written law was further expounded through supplementary texts called *Midrash*. The oral law developed from *Mishnah* to *Talmud* and then further throughout the generations.⁸

Tractate *Tohoros* delves into the laws of ritual contamination. Through the in-depth explanations of the utensils in relation to how they become impure, we can learn about tools that disappeared hundreds of years ago.⁹ Of those tools, special attention is given to earthenware vessels which can only become impure if an impurity enters the cavity of the vessel.¹⁰ The following excerpt illustrates this point:

A *machatz* is a large earthenware utensil, whose shape was similar to a wine press [i.e., round and deep]... It was used to transfer wine or oil from the pressing pit to the storage barrels.... Due to its large size..., a barrel-shaped handle was made in the wall near the bottom of this utensil into which a person could insert his hand to aid in lifting it. This handle is, in effect, a receptacle, but since it was not designed to contain anything, it does not contract *tumah* [impurity].¹¹

From this explanation, we can infer the shape and purpose of this earthenware tool that is no longer used in the present day. Although Jewish laws of ritual purity and impurity are largely no

⁷ Gordan, YOSHUA BINYAMIN. Lecture. *Tanya with Rabbi Gordon*. Podcast audio. Chapter 33 Likutei Amarim

⁸ Telushkin 149-153.

⁹ *Keilim (Chapters 1-16)*. ArtScroll Yad Avraham Mishnah Series. (Brooklyn, N.Y.: Mesorah Publications, 2010), xvii.

¹⁰ Mesorah 55.

¹¹ Mesorah 161.

longer in effect today, they still play a key part in the Jewish educational system and are studied regularly around the world. As was explored, Judaism has a long history with ceramics and its spiritual connections.

An element of Jewish life dealing with vessels that still in practice is the idea of *Hiddur Mitzvah*, the beatification of a commandment. This concept originates from a *Mishnaic* comment to the biblical verse "This is my Gd and I will glorify Him,"¹² in which Rabbi Ishmael asks, "Is it possible for a human being to add glory to his Creator? What this really means is: I shall glorify Him in the way I perform *mitzvot* [commandments]. I shall prepare before Him a beautiful *lulav*, beautiful *sukkah*, beautiful fringes (*tzitzit*), and beautiful phylacteries (*tefillin*)." ¹³ Although the specific objects mentioned by Rabbi Ishmael may not be relevant for the purposes of this paper, the list was necessary to establish importance. *Hiddur Mitzvah* is an important part of Jewish life to the point where it was explicitly ruled in the *Talmud* that one should pay up to an additional third more than the average price for the beautiful version of an item needed for a commandment.¹⁴ Interestingly, there is a harmony with using a beautiful object for a commandment and the one doing the commandment. The *Midrash* of the Song of Songs Rabbah equates the beauty of the one doing the commandment and objects used; "You are beautiful in *mitzvot*... You are beautiful in *mezuzah* [scrolls put on the doorposts of Jewish homes]; you are beautiful in *tefillin*; you are beautiful in *sukkah*; you are beautiful in *lulav* and *etrog*."¹⁵ To reiterate: it is not only important to use a more beautiful and expensive object, typically a vessel of some form (as which was explored in this body of work) but it is also crucial to know that the user will make spiritual gains from the usage.

To understand how to channel this lost history of a culture dedicated to the development of beautiful objects I turned to futurism. Futurism, started in 1909 Italy, is a movement that spread through architecture, art, literature, and politics. The original manifesto spoke of the importance and beauty of machinery and technological advances. They made claims about how the past holds us back and how war cleanses the old to make way for the new: "We intend to glorify war - the only hygiene of the world..."¹⁶ To which I asked the question, what about the

¹² Shemot 15:2

¹³ MJL Staff. "Hiddur Mitzvah: The Case for Beautiful Ritual Objects." My Jewish Learning. Accessed October 31, 2019. <https://www.myjewishlearning.com/article/holiday-art/>.

¹⁴ Bava Kamma. The William Davidson Talmud. https://www.sefaria.org/Bava_Kamma.9b?lang=bi.

¹⁵ Shir haShirem Rabba. Vol. 1. https://www.sefaria.org/Shir_HaShirim_Rabbah.1.15?lang=he.

¹⁶ Salaris Claudia, "The Invention of the Programmatic Avant-Garde." In *Italian Futurism 1909-1944: Reconstructing the Universe*, ed. Vivien Greene, (New York, NY: Guggenheim Museum Publications, 2014), 23.

destruction of the past through war that is done maliciously and against the will of the people? There is no historical basis for a Jewish art style since that part of our past has been destroyed through war and genocide. I felt encouraged to create because of this resulting lack of a historical basis. Through this unintended ideological lens, I was able to gain an understanding in what was lost and how to move forward. While I didn't have history to hold me back, I also didn't have history to help me move forward.

Although the First World War was a significant blow to Futurism, a second generation of Futurist artists rose up after the war. These artists were dedicated to showing and developing the spiritual aspects of the machine in their work. In his *Manifesto dell'Estetica della Macchina*, Enrico Prampolini announced that it was the job of the Futurists to "...reproduce the spirit, and not merely the exterior form of the machine."¹⁷ This idea resonated with me. As explained above, Judaism has multiple established concepts of spirituality in ritual and utilitarian objects. This led me to question what effect would there be if machines added to the process of making spiritual Jewish objects. I deepened my inquiry by adding a context of self-imposed antagonistic notions of the relationship between religion and modern technology which I explore through my art. Although few people believe that religion and technology are antithetic of each other exploring the idea of them being opposites and then combining them creates an interesting tension.

One of the reasons I chose to develop a body of work about driving together religion and technology is because I needed to ground my own art. I decided early on that I wanted to make Jewish art. Without a working definition and history to look back upon I felt lost within a world of possibilities. What are the limitations? What questions need answering? What questions need asking? And so, I asked the most basic question: what is Jewish art? Without a strong historical precedent to form an answer, I tried to understand the question. Stephen Kayser argues in the introduction to *Jewish Ceremonial Art* that "while there is no Jewish art style, there is a Jewish art, the Jews expressing themselves in the art-forms of the surrounding world."¹⁸ With the practice of melting gold and silver items, especially Jewish ones, and with the repeated forced migration of the Jewish people it makes sense that Jews constantly adapted and changed their

¹⁷ Clough Rosa Trillo. "Futurism after the First World War." In *Futurism: The Story of a Modern Art Movement : a New Appraisal*, (N.p.: Greenwood Press, 1969), 135-137.

¹⁸ Kayser, 10.

art.¹⁹ That establishes why there is no set Jewish art style, although Kayser does argue for a strong Baroque influence (as explored earlier).

With that basic understanding of the Jewish art style, or lack thereof, we are not any closer in defining the question of Jewish art. Bella Rosenbaum, in her book *Upon Thy Doorposts: The Law, The Lore, The Love of Mezuzot: A Personal Collection*, recalls a dispute during the first International Conference on Jewish Art in Jerusalem: "If a non-Jew crafted Baroque ornaments for the Torah, or a German silversmith fashioned an Augsburg *Kiddush* Cup, was that Jewish art? Conversely, if a Jewish artist painted a portrait of a Gentile patron, or created ornaments for the church, are those objects Jewish art?"²⁰ With this as groundwork I began to understand what questions to ask to define Jewish art. I added to her questions: If a machine made objects for Jewish rituals, is that Jewish art? If 21st century technology is simply used as a tool, then the question does not change since the artist is making all the decisions. But what if the tool is making the decisions? To what extent does the tool have to influence the final result to change the conversation away from being between Jewish or not-Jewish creators and instead have it be about the maker being neither?

My intended outcome for this body of the work was for the viewer to see how modern technology affects Jewish ceramic art. To that extent, I used digital fabrication techniques, which are processes that transform immaterial forms into physical objects. In doing so, they impart what are generally considered to be unwanted surface information into the form. By magnifying these artifacts that the processes uniquely provide, the resulting vessels' forms showcase each process used to create it. This was a play on the idea of seeing an artist's hands in the work. In these pieces I explored both the artist's touch and the machine's touch by highlighting and blurring the lines between them.

As the medium for this discussion, I used the forms of vessels used in daily Jewish life, more specifically those used at the start of a festive meal. There are other vessels used throughout the day and at the end of a meal, which are outside the scope of this thesis. Every week, Jews take Friday night to Saturday night as a day of rest called *shabbat*. Since Gd created the world in six days and rested on the seventh, so do we. The reason I chose this and not a normal day is due to the greater number of rituals. This account will cover all types of vessels which I explored in my work and it will also explain others in order to give a somewhat

¹⁹ Rosenbaum, Bella. *Upon Thy Doorposts: The Law, the Lore, the Love of Mezuzot: a Personal Collection*, (New York, NY: Jacob and Bella Rosenbaum Foundation, 1995), 78.

²⁰ Rosenbaum, 78.

complete picture of the start of a meal. There are multiple rituals that start a meal. This is because in Judaism there is a connection between the table and biblical sacrifices. As is explained in *Talmud* tractate *Berachot* (Blessings), "When the Temple stood, the sacrifices brought on the altar would atone for Israel. But now, when there is no Temple, a person's table—upon which he feeds the poor—atones for him."²¹

Candles are lit to mark the start of a day of rest which occurs before the meal begins. These candles, in the case of the *shabbat*, are known as *shabbat* candles. They are traditionally put in ornate candle stick holders, as was introduced above with the concept of *hiddur mitzvah*. This is a commandment specific to women and, if she is married, is done on behalf of her husband as well. To further this intent, usually *shabbat* candle sticks come in pairs. *Kiddush* roughly translates to sanctification. *Kiddush* cup refers to the goblet, usually stemmed, used to make a blessing of thanks and of wine at the beginning of a festive meal.²² If the *kiddush* cup is not stemmed it is instead known as a *bechar*. Before the meal starts, after *kiddush* is said, the attendees of the meal wash their hands for bread using a two handled cup. The cup is filled with water, then held in one hand while splashing the other hand three times consecutively before repeating with the other hand.²³ Afterwards, everyone sits down for the blessings over the bread.²⁴ The head of the family makes a blessing over the traditional bread, known as *challah*, and then dips it into salt before passing around the slices.²⁵ *Shabbat* is a time of family and community. It puts the daily grind of the work week into perspective. *Shabbat* reminds us that the reason we work hard everyday is for those parts of our lives that are greater than ourselves, like our family.

Perspective was an also important part of my making process. My process was structured but still organic, with a lot of back and forth between steps. I felt that constantly changing my perspective and understanding of form was a key part of my making. I started by

²¹ Shurpin, Yehuda. "Why Do We Dip the Challah Bread in Salt?" Chabad. https://www.chabad.org/library/article_cdo/aid/484194/jewish/Why-Do-We-Dip-the-Challah-Bread-in-Salt.htm.

²² Hermann, Bennett M., and Ismar David. *Gates of the Seasons: A Guide to the Jewish Year = [Sha'are Mo'ed]*. Edited by Peter S. Knobel, (New York: Central Conference of American Rabbis, 1984), 25-26.

²³ Schneur Zalman of Liadi. *The Laws Governing The Washing Before Grace*. New York, NY: Kehot Publication Society, n.d. https://www.chabad.org/library/article_cdo/aid/3335541/jewish/Shulchan-Aruch-Chapter-181-Rulings-Concerning-Washing-Before-Grace.htm.

²⁴ Schneur Zalman of Liadi. *Rules Governing Washing One's Hands for a Meal*. New York, NY: Kehot Publication Society, n.d. https://www.chabad.org/library/article_cdo/aid/3323451/jewish/Shulchan-Aruch-Chapter-158-Rules-Governing-Washing-Ones-Hands-for-a-Meal.htm.

²⁵ Yehuda, "Why Do We Dip the Challah Bread in Salt?".

taking gridded paper and folding it in half. By sketching out a profile and cutting it out I would get a symmetrical 2D form. If the form needed altering, I traced the profile onto another paper and made the necessary changes. This process was taught to me by one of my teachers, Peter Pincus, who was taught this method by his teacher, John Gill. Using this method, I quickly developed a library of components that I could combine and reorient to create several different forms. After playing around with combining components and dialing in their individual forms, I moved on to the next step.

Here, I scanned each component and uploaded them into Autodesk's Fusion 360 program (to be referred to as Fusion). Autodesk is one of the leading developers of CAD programs. CAD is a general term but was recently come to refer to programs used to design 3D objects in virtual space. I found Fusion to be the easiest way for me to create several different forms and alter them, with minimal hassle, while being able to retrace the steps I took within the program. I used version 2.0.3034 until the release of version 2.0.5688 during this thesis. Fusion made remarkable progress within a short amount of time, which made staying current with each changelog a key way to understand new features. Within Fusion, I traced over each sketch and then revolved the profile around a central axis. This created a solid form that was very similar to my original sketch. I am interested in how the form changes between the 2D sketch and the 3D model. Since I cannot fold perfectly when I unfold my paper profile the form's proportions are different than when I use a CAD program and I perfectly revolve my form.

Henceforth, I will be referring to components as the parts of larger compositions called forms. I quickly learned that trying to stack and play with orientations of my components in Fusion was not an intuitive process. Instead, I took screenshots of my components and printed them out, to scale, going from a physical 2D drawing to a 3D CAD model back to a physical 2D picture. From here I was able to easily overlap components and rearrange forms. Going back to my 3D models I made my final alterations while considering how forms could attach to one another. With the CAD models finished, I 3D printed my selection of components.

3D printing is a means of taking a virtual 3D object and making it a physical 3D object. There are a variety of different methods of 3D printing. I used two different methods, Stereolithography (SLA) and Fused Deposition Modeling (FDM). SLA printers use UV light to cure liquid resin, layer by layer, to form a complete form.²⁶ This is a time and material intensive process due to creating completely solid parts with an inherently high resolution. SLA prints

²⁶ Formlabs. "Ultimate Guide to Sterolithography." Formlabs. Accessed November 6, 2019. <https://formlabs.com/blog/ultimate-guide-to-stereolithography-sla-3d-printing/>.

offer plastics with a wide variety of material qualities such as those that have higher tensile qualities, function like clean-burning wax, and are crystal clear. FDM is a quicker process that leaves a more noticeable low surface quality due to its lower resolution. The resulting prints are not necessarily solid but usually have a solid perimeter with an internal support structure called infill. FDM printers work by drawing a layer of extruded plastic on its print surface, as the extruded plastic cools it bonds with the layer below it. The printer then moves its extruder to the next layer, drawing a pattern again. This ultimately creates a completed form.²⁷ Both FDM and SLA create forms layer by layer. To go from a CAD model to instructions for the printers, a slicing program is needed. This program takes the CAD model and cuts it into horizontal slices. The slicer then takes these slices and turns them into instructions for the printer. Each slice becomes a layer when printed. Throughout this project I used Ultimaker's S5 FDM printers and Formlabs' Form2 SLA printers. For FDM prints I relied on Ultimaker's iteration of Cura, an open source slicer software. I used versions 2.7.0, 4.2.0, and each version in-between. For SLA printers I used FormLab's proprietary slicer, PreForm. I used each version between 2.6.1 and 2.20.0.

Converting an object from virtual space to physical space isn't a perfect conversion. Depending on the model, and the support structures around it, the form can distort depending on its positioning when printing. The process of building layer by layer adds striations to the surface which can be thickened by lowering the resolution of the model. Lastly, you are giving a material, and all its nuances, to an immaterial thing. Essentially, I give the printer instructions to make the thing that I want, it reads those instructions, and makes what it thinks that I want. It fails at making exactly what I want but exceeds in making a thing based on what I want. This is like Sol LeWitt, an American Jewish artist, who for his body of work, Wall Drawing, made instructions.²⁸ These instructions tell a different maker how to make marks on a wall. The final piece is a Sol LeWitt even though he does not see it until it is finished and has no physical part in making. This process challenges the idea of art being a unique product of the artist.²⁹ Sol LeWitt is exploring how much ownership he had over the work when he didn't make it and how much ownership does the maker of the piece have? To a lesser extent I wonder the same about

²⁷ 3DHubs. "Introduction to FDM 3D Printing." 3DHubs. Accessed November 6, 2019. <https://www.3dhubs.com/knowledge-base/introduction-fdm-3d-printing/>.

²⁸ Ivry, Benjamin. "Sol LeWitt: A Jewish Artist's Leap Into the Unknown." The Forward. Accessed November 6, 2019. <https://forward.com/culture/105238/sol-lewitt-a-jewish-artist-s-leap-into-the-unkn/>.

²⁹ Drohojowska-Philp, Hunter. "Conceptualism by Proxy; Sol LeWitt's Ideas for Painting and Sculpture Serve as Instructions for Others to Complete.: [Home Edition]." Los Angeles Times (Los Angeles, CA), September 26, 2001. <https://search.proquest.com/docview/421782242?pq-origsite=summon>.

my work. If a 3D printer can make elements of, or the entirety of, my art; to what extent is it my art? How far removed do I have to be for it to still be my art? Until what point can it still be considered Jewish art?

As I removed the 3D print from the printer, I made sure to keep intact the external support structure around the 3D print, which was generated to support overhangs, and the raft, a thin layer of plastic that helps with adhesion of the print to the building platform. These are both integral elements of 3D printing process, which are automatically generated by the slicer, that are normally thrown away. When the form called for it, I reintroduced these components in the final piece. My goal was to highlight these iconic but overlooked elements to bring attention to the process. An unexpected benefit to printing in plastic was that I could keep a surprising amount of surface texture when making a plaster mold of the form. This was due in large part to the nonporous quality of plastic. Plaster doesn't stick to plastic, which is a quality that the usual materials available to ceramic artists, such as clay and wood, don't have.

Mold making can be both a forgiving and unforgiving process. Until you understand your limits, the process is unforgiving. Once you understand those limits, then the process becomes surprisingly forgiving. Before I started, I thought that all the gnarled surfaces that often result from the 3D printing process would need to be sanded down. My concern was that the surface would create too much friction or have undercuts, sticking the positive to the mold. However, I learned that with a tiny bit of clay to fill in the minor undercuts I could keep the integrity of the surface during the mold making process. This gnarled surface often occurs where the external support structure meets the model's form. It is usually seen as a defect and is often sanded down. However, just like with the raft and supports, my goal was to showcase the decisions and changes the digital fabrication process made to the work.

My mold making process was adapted from Peter Pincus' mold making methodology. As a student under his tutelage I had firsthand experience seeing his way of developing molds. Peter makes complex mold systems through extensive planning and through wet sanding (lapping) each mold piece until it is flat before casting the next. I followed his methodology but made changes to fit my needs. His process involves casting past the positive's curves, giving the mold a little undercut, before breaking out the positive. He then sands down to the broken edge, casting the next piece, and then sanding down that piece until he negotiates the part line to where he needs it. I made more than twenty molds, at least one for each component, and I didn't have the ability to spend so much time on a single part line. Instead, in the CAD model, before I printed, I took all the rounded surfaces and cut a subtle vertical plane out of the

outermost point of the curve. That way, when making a mold, I had leeway where my part line could go without creating an undercut. This detail can be easily added to a CAD model but would be very challenging to attempt when making a positive by hand.

Peter introduced me early on to Andrew Martin's *The Essential Guide to Mold Making and Slip Casting* as an integral reference to mold making. In it, Martin shared his understanding of developing positives, molds, and casting. While his book was critical in expanding my understanding of molds it proved especially useful in improving my understanding of the chemistry behind slip casting. Plaster molds are naturally absorbent. Taking advantage of that, ceramicists pour liquid clay into the mold. The plaster absorbs the water leaving a shell of thickened clay. Once the shell is thick enough, the remainder of the clay is poured out, leaving behind a clay replica of the positive used to make the mold. If using just normal watered-down clay, the plaster would become over saturated with water and no longer be absorbent. Instead, we use what is known as a casting slip.

A casting slip has the same chemical composition as throwing or hand building clay but has a higher density of particles while still being liquid, as opposed to being a paste. This difference is caused by a deflocculant. As Martin explains in his book, when a deflocculant is added to clay, it "changes the positive electrical charge on the edge of the clay plate [particles of which clay is composed of] to a negative charge. When this occurs, the plates repel each other [...] the clay particles no longer flock [together like sheep due to their opposing charges]- they deflock."³⁰ Getting the right specific gravity of the slip through the addition of deflocculant is integral for making slip that is easy to work with. Specific gravity is the ratio of the slip's density over an equal volume of water. With the right specific gravity, between 1.65 and 1.8, the slip flows freely and stiffens smoothly when put in a mold.³¹ Having a properly made slip was especially important since I was balancing several different molds while keeping track of each one's unique characteristics. Once cast, removed from the molds, and left to dry, the components go through a firing process.

I fired my ceramic pieces in a kiln at least twice. The first firing is called a bisque firing. This initial firing turns the dry clay from what is essentially a nicely shaped pile of dust to a solid but porous rock. I bisque fire to cone 05, about 1880°F. A cone is a standardized temperature used in ceramics. Temperatures range from cone 022 (1087°F) to cone 14 (2489°F) and the

³⁰ Martin, Andrew. *The Essential Guide to Mold Making and Slip Casting*, (Newly rev. ed. New York, NY: Lark Books, 2006), 116.

³¹ Martin, 125.

intervals between cones are not regular.³² This makes my pieces soft enough that I can sand them easily, strong enough to handle them, and porous enough to accept glaze. Sanding was an important step in my work. This was when I could edit all the surface information and remove what I did not want. I also paid close attention to the rim of the vessel. As I was taught by Jane Shellenberger, the rim is a key interface between the user's lips and the vessel. She demonstrated that by rounding the inside edge but keeping the outside edge soft but square, the liquid inside rolls off and get cut by the rim. This lets the liquid leave the vessel in a smooth controlled stream. After sanding, I took my time and played with the components. This was the first time in my process that I had multiples of each component. This was when I explored the intricacies of each form, not as an idealized representation like when they were CAD models, but as real physical objects. I stacked and combined them while taking pictures of the combinations. The pictures became a way for me to catalogue my explorations.

Once I grouped the components by final form, leaving multiples of each component in each group as backups, I was ready to start glazing. Glaze is composed of three main ingredients: silica, stabilizer, and flux. Silica is needed in order to become glasslike. This poses an issue as it melts at around 3110°F. To lower this melting point flux is added. Flux are materials with a significantly lower melting point than silica. Another issue is that flux prevents the glaze from sticking to the surface of the form while it is melting. A stabilizer is added to prevent this.³³ Before it is fired, melts, and becomes glasslike the glaze ingredients are suspended in water. This mixture can be applied several ways. Of them, I primarily poured glaze in and out of forms to cover the interior and brushed to apply glaze on the exterior. Glaze plays an important role in my work referencing a significant part of Jewish history.

During the medieval period ceramics and other crafts developed through the artisan guild system. This system barred Jews from creating art. Thankfully, that was only in Christian controlled countries. Islamic countries allowed Jews to become metalsmiths. This led to a wealth of Jewish metalwork that still survives today.³⁴ Wanting to reference this history led me to metallic glazes. One thing I quickly realized was that metallic glazes often rely heavily on manganese dioxide. Manganese dioxide must be handled with extreme caution as it becomes volatile when fired and releases toxic fumes.³⁵ Since Judaism believes that maintaining a

³² "Orton Cone Chart." Chart. Orton Ceramic. Accessed November 7, 2019. <https://www.ortonceramic.com/files/2676/File/orton-cone-chart-2016.pdf>.

³³ Britt, John. *The Complete Guide to Mid-range Glazes: Glazing and Firing at Cones 4-7*, (New York, NY: Lark Ceramics, 2014), 14.

³⁴ Rosenbaum, 78.

³⁵ Britt, 31.

healthy body is an important aspect of daily life I felt it important to avoid the use of especially harmful materials when making this work.³⁶ This led me on to create a metallic glaze with no manganese dioxide since I was unable to find an existing recipe. I started with Anne Hironnelle's Soda Ash Glaze³⁷. Hironnelle was able to create beautiful metallic colors with this glaze but I was unable to reproduce her results.

Looking for other leads, I found promise in Tony Hansen's cone 6 metallic oxide tests, on his site digitalfire.com. There he showed results of 50/50 mixes of frit 3134 (a synthetic combination of glaze materials) and metallic oxides. Based on his results I created:

Gabber's Black Mirror glaze (Cone 6)

Frit 3134 48%	Black Copper Oxide 48%	Copper Carbonate 4%
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This was a beautiful mirror black glaze that, unfortunately, was only reproducible in very small kilns with extremely fast heating and cooling cycles. Black copper oxide is a strong flux making the glaze run if not fired under precise and impractical conditions. My attempts at adding stabilizers led the glaze to change too much leading me to decide against pursuing the glaze further. Instead, I turned to commercial glazes, especially AMACO's Saturation Metallic glaze. This glaze is formulated for cone 6 electric firings and since it was a metallic glaze like I was looking for, I changed my firings accordingly. Clay bodies that mature at cone 6 are more porous than those that mature at cone 10.³⁸ This allows me to still reference the porosity of earthenware which fueled the religious discussion of ceramics while having the ease of access to metallic glazes.

After the components were glaze fired it was time to evaluate them. Heating ceramics is a very active process; a lot of changes happen chemically and visually. As the kiln gets red hot the clay moves as it shrinks. If this movement is uneven then the piece ends up warped. In my experience, slip cast porcelain was especially susceptible to warping. Once the components are out of the kiln, I needed to decide which ones to keep and which ones to discard. Often my stems warped too much and needed to be discarded making me react and develop forms I

³⁶ Gordan, Yoshua Binyamin. "Rambam: De'ot, Chapter 4." Lecture. Rambam with Rabbi Gordon. Podcast audio. Accessed September 12, 2019.

https://www.chabad.org/multimedia/audio_cdo/aid/1854013/jewish/Rambam-with-Rabbi-Gordon.htm.

³⁷ Hironnelle, Anne. "Delibearations." *Ceramics Monthly*, August 1986, 34-39.

³⁸ Britt, 13.

originally didn't think of. Planning ahead, I made multiples of each component for each form. This was to increase my chances that I would have enough usable components to make the forms I wanted. Sometimes, I made components whose forms were not self-supporting, and each cast warped.

Reacting to the useable components available made me rethink my forms with what I had at my disposal. I also made a point to use as many leftover components as possible, further creating forms that I had not originally planned. With my components no longer needing to enter the kiln I started to combine my pieces in a post-firing process using Gorilla's 2 Part 5 Minute Set Epoxy. Combining components post firing gave me more freedom in designing forms. My stem components did not have to support any weight besides themselves when firing, allowing me to make them much thinner. Additionally, it also freed up my concern for undercuts when designing molds. Lastly, it allowed me to combine different materials in one form. I could easily add plastic components that would reinforce the stem or that completed the curve of a ceramic component.

In this secondary design process, I kept in mind Hans Coper's work. Hans Coper was a pillar of British studio pottery. Not originally from England, he escaped from Germany in 1939. He left during the start of the Nazi's rise to power. Growing up in a Jewish family, he realized early that the only way to survive was to leave the country.³⁹ Perhaps reflecting his past in his work, he made many pieces with a heavy base that supported a lighter and airy vessel. The stem that connected between the two played an important inspirational role in my initial designs and my assembling stage. I also drew inspiration from how he combined disparate shapes together into a cohesive whole. With my pieces fully assembled I moved to the next stage of my process: sitting with the work. Analyzing what I made was an important step that helped me realize the effects of each decision had I made and gave me an idea how I would move forward.

³⁹ Birks, Tony. Hans Coper, (New York, N.Y.: Harper & Row, 1983), 11.



Fig. 1: Kiddush Cup Pair 2

As explored before, digital fabrication leaves behind artifacts which are a telltale sign of the process but are generally considered unwanted.

I crystallized this concept in, *Kiddush Cup Pair 2*.

I started by designing a traditional *kiddush* cup in CAD and then divided the vessel at the top of the form into identical sections. I printed one of these sections parallel to the printing bed so the ring-like 3D printed texture was accentuated significantly as seen in Figure 2. The final form showcases the texture created by the printer and the seams inherent in the mold making process. Since the mold was generated with multiple sections, I had more control over applying color. Metallic glaze was used to reference the history of Jewish metalwork. Lastly, a clear 3D printed junction piece connects the two sections of the form's stem. This promotes a sense of drama at the meeting of two thin points while creating a strong reference of the beginning steps in the finished piece.



Fig. 2: Kiddush Cup Pair 2 Detail



Fig. 3: Pair of Kiddush Cups 3

Pair of Kiddush Cups 03 explores what happens if I erode the surfaces of the forms, attempting to remove all traces of the 3D printer. Unlike most of the work I made there are no plastic components. However, all the forms here were printed before being used to make a mold. In the mold making process I kept as much texture as possible. After bisque firing, I actively removed the artifacts of the printing process through sanding, as is evident in the cup portion of the form, and covered over it by using glaze, as is shown on the stem and base. The stem meets the cup without a 3D printed connector, as I usually used in Figure 1. This brings tension to the piece which is otherwise pared down to the basics. There is a clear visual hierarchy between the primary, secondary, and tertiary forms. The delicate nature of the form is needed to force the user into the moment during the ritual of *kiddush*. In my personal experience, I noticed people who, having been observant all their lives, rush through rituals without thinking because they are second nature. This stem, and the delicate stems of other pieces, are a reaction to this. They force to the user to slow down and treat more object and the ritual more thoughtfully.



Fig. 4: Salt Cellar 2

Salt Cellar 2 is not made with clay but with plastic. It is heavily inspired and influenced by ceramics. The textures and artifacts of my processes are vital to my work. This piece utilizes the qualities of 3D prints in a very different way than most other pieces in this body of work. Here, I am using the striation texture as an allusion to ceramic throwing lines. The top of the piece has a gnarled texture resulting from the connection of the print's support. Imagine this piece without the pedestal foot and upside down: this is how the form was printed. The overhang, which is gold in the Figure 4, is where the support structure met the print. A support structure is needed when printing in order to support significant overhangs, however, this often creates a gnarled texture which is usually seen as a major blemish and it is thrown away having served its purpose. This piece subverts

those ideas. The gnarled texture is highlighted with the gold leaf and the support structure is kept and repurposed as the base of the form. In contrast to *Pair of Kiddush Cups 3*, this piece has very little of my touch involved. Instead this form showcases the 3D printer's touch.



Fig. 5: Shabbos Candlesticks

Fig. 6: Gabber Family Shabbos Candlesticks
(Photo by Rena Gabber)

A few years ago my mother, Dorit Gabber, received candlesticks that her relatives kept after her grandmother past away. She was always interested in her family's history. When these candlesticks came into our lives, so did stories of Kristallnacht and the Holocaust. I grew up with stories of the horrors my family survived but these gave those stories a physical manifestation. In an email to my immediate family, she relayed their story:

Safta [Grandmother] Irina, Safta Rozi's mother, used these candlesticks for Sabbath in Vienna before the Holocaust. Then in the Kristallnacht, the Nazis came and took everything from them: everything from their store and from their home and loaded the things to a big truck that waited on the street outside their home (I read it in her letter). Safta Irina was able to save these candlesticks. She took them with her to Palestine on the ship and used them in Kibbutz Shluchot.

After the Holocaust, Safta Rozi came to Israel. When Safta Irina passed away, the [sic] Safta Rozi started lighting them for Sabbath. When I was a little girl and I would visit her in Jerusalem and see these candlesticks. They looked huge (I was little), beautiful and magnificent. Safta Rozi lit memorial candles next to them. Then, she would

tell me stories about the Holocaust. So that for me the candlesticks are strongly connected with Safta Irina, Safta Rozi and with the Holocaust.⁴⁰

I felt that I had an opportunity to reimagine these important family artifacts within this body of work. With *Shabbos Candlesticks* I was able to take one of my goals, examining Jewish objects using 21st century technologies, and make a more personal connection. The form that I developed not only stayed true to its source but also gave me time to plan out glazing during form development. I decided where the glaze would go during the initial sketching and altered the form to help me control the glaze. I specifically wanted this vibrant blue because it is a demarcation of holiness in Jewish tradition.⁴¹

My thesis exhibition consisted a one day exhibition in Congregation Beth Sholom, a local orthodox Jewish synagogue, where I pray every morning. This exhibition was inherently restrictive. It was only up for a few hours as it is a community space and is used for services in the morning and evening everyday. However, working with the time restriction was worth the effort because, with the Rabbi's blessing, we were able to open his very private space to the public. Within the four hours that the show was open, about eighty people came with a good mix of people from the public and the Jewish community.

⁴⁰ Gabber Dorit. E-mail interview by the author. April 18, 2019.

⁴¹ Locks, Gutman. "The Contradictory Color." Chabad.org. Accessed November 14, 2019. https://www.chabad.org/kabbalah/article_cdo/aid/1407039/jewish/The-Contradictory-Color.htm.



Fig. 7: Scene from Inspecting Traditions Instillation

I placed my work in the small and intimate chapel, as seen in Figure 7, that is used for weekday services and in the larger chapel, shown in Figure 8, used for holiday and weekend services. To merge the pieces and their environment I placed them in the small chapel on existing furnishings and kept pedestals to a minimum. For those who were new to this environment, the importance and history of the locations would be evident. One of my concerns in placing my work among the furnishings of the small chapel was that to people who used the space every day, it would not feel special. One of my goals was to draw renewed interest in the space and have it seen in a new light. With my pieces, I made delicate stems to draw attention to the ritual so that when used, the ritual is done with attention. In the same vein, I wanted to draw attention to this special place that has become mundane with daily use, so that the chapel is seen with the same care that as my work is.



Fig. 8: Scene from Inspecting Traditions Instillation 2

In conclusion, the goal of this work was to add to the conversation around the definition of Jewish art. My contributions to this discussion were around the point of the creator. Does the artist have to be Jewish? If the theme is Jewish can the creator be not Jewish? Those were established questions. The question that I added at the end of my process was: What if the creator is not Jewish and not human? Starting from what is already known, a Jewish artist's art about Judaism is Jewish art. A non-Jewish artist's art about Judaism might be Jewish art. In the middle is my work, a Jewish artist who gives instructions to a machine to make art either about Judaism or Jewish art or both. Understanding which of these categories the results falls under is what my work explores. My work pushes this question by exploring to what extent does the machine's decisions push the work out of the realm of a Jewish artist's art and into the realm of the machine's art. I first internalized Futurism's understanding of the spiritual aspects of machinery. Then, to explore the idea, I kept the changes that the CAD software and 3D printers made throughout the making process to varying degrees. In some pieces I removed traces of the printer while others I barely made any changes to what came out of the printer. The majority were somewhere in between those two extremes where I merged the elements that showed my hand and elements that showed the printer's hand. That intersection provided a fruitful ground where some of my work's most interesting decisions happened.

Figures



Fig. 9: Scene from Inspecting Traditions Instillation 3



Fig. 10: Kiddush Cup 9



Fig. 11: Jar 3 Detail 1



Fig. 12: Jar 3 Detail 2



Fig. 13: Jar 3



Fig. 14: Salt Cellar 2 Detail 1



Fig. 15: Salt Cellar 2 Detail 2



Fig. 16: Salt Cellar 1

Fig. 17: Salt Cellar 3



Fig. 18: Kiddush Cup 10



Fig. 19: Kiddush Cup 10 Detail



Fig. 20: Kiddush Cup 11



Fig. 21: Kiddush Cup 12



Fig. 22: Bechar and Salt Cellar



Fig. 23: Bechar and Salt Cellar Detail



Fig. 24: Kiddush Cup 8

Fig. 25: Kiddush Cup 7



Fig. 26: Vase 1

Fig. 27: Vase 2



Fig. 28: Untitled



Fig. 29: The Twelve Tribes

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