(Dish, n.d.)

ITALIAN RENAISSANCE MAIOLICA

Documentation regarding the process used to create Italian Maiolica in Italy during the renaissance.

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Contents

Introduction

Italy has a long history of ceramic art and techniques. From its Arretium ware in the first century BCE to its praised Renaissance maiolica. Italian maiolica is the blending of both the renaissance mastery of painting along with a long history of ceramics. With its narrative scenes, bright colors, married with the shapes it was on this art style provided more sophistication then was previously found on European bringing the art forms to the never before achieved artistry of Asian pottery. These pieces were so prized that even Lorenzo de Medici called them an equal in artistic merit to the work of the jeweler and silversmith (Caiger-Smith, 1973).

Several different techniques including the Islamic tin glazed wares (also known as tin-glazed or Hispano moresquo ware) contributed to majolica, but the scientific and artistic blending which was prized during the European Renaissance pushed these techniques further with the discovery of new pigments and glazes creating new techniques.

For this paper I will be examining the growth and creation of this decorative style as well as the process used during the 16th century for creating these pieces using as my primary source Li tre libri dell arte del vasaio by Cipriano Piccolpasso of Castel Durante (Piccolpasso). As many of the chemicals are now modernly known to be toxic, the focus is an examination of the historic process, without experimentation to mimic these processes.

Background

While the source of the name Maiolica is not known, one commonly held idea is that it comes from the island of Majorca, the technique which provided to most inspiration is clearly evident. One of the largest influences can be attributed to the Islamic tin-glazed decorative technique. This technique combined glazes with oxides and tin to create a lustered effect which could be painted onto pottery forming different scenes.

The tin-glaze technique was used widely throughout the middle east and into Spain and Europe, the archaeological evidence points to the creation of this technique developing in Iraq during the 800 C.E. During this period ceramic wares were being traded between China and the Islamic nation. The white stoneware with its slightly translucent look had a substantial impact on the Islamic culture and was written about in various manuscripts (Caiger-Smith, 1973). It is conjectured that Tin glazed pottery developed out of an attempt to re-create the look of this pottery. Using a new process of adding tin oxide to a glaze to create a white surface along with an, up to that process used only in glass creation, of reducing oxides of copper and silver in low-temperature firings a new iridescent luster look on ceramics was produced (Wilson, 2013).

With the expansion of the Islamic world the tin-glazed luster technique reached further areas eventually reaching Morish Spain with large centers forming in Malaga, Murcia, Almeria, and Granada. This expansion into Europe lead to these wares to be traded further with recorded trading to France, Italy, England, and North Africa (Caiger-Smith, 1973).

With the demand for this fresh style, re-creations were created in Italy. The secrets of the luster fire were not known though, and several tin glaze-based methods developed. The first use of Tin Glaze ware created in Italy was made in Sicily and South Italy and is known as "protomaiolica." This style used a tin-based glaze on the main surface, but the outside surfaces were often left unglazed. This was likely due to the cost of Tin which at the time was primarily imported from England (Poole, 1997). The colors found in these wares were cobalt blue, antimony yellow/brown, green, and manganese brown/black. Many of the motifs were geometric or abstract in nature with the occasional figures (Vassiliou, 2018).

In Central and North Italy, a form of maiolica known as "archaic maiolica" or "Orvieto ware" was developed in the 13th century. Once again, likely due to the cost of Tin these pieces were only partially tin-glazed. This decorative technique employed a two-tone color pallet of manganese-brown, and green created using copper-green. In the 1350s cobalt blue was introduced as a colorant to this style (sometimes mixed with Manganese-brown) increasing the color palate, and by approximately 1460 C.E. antimony-yellow was added and the polychrome decoration was established (Poole, 1997) .

From the 1430s to the 1530s the designs of these pieces began to change from simple designs to complex figures and scenes with multiple colors and shading. The shapes were secondary to the painted decoration and often the clay-workers and throwers were separated individually from the painters.

Growth of the Industry

The ever-growing demand for luster wear provided a market for potters to meet this demand. As the ability to create complex designs with increased colors developed in Italy more nobility turned to their own potters for commissions. This increase in looking closer to home for ceramics as well as the expulsion of the Moors in 1610 to North Africa removed the majority of Spanish imports and set Italian pottery as the standard in the 16th century (Maiolica Italian Renaissance Ceramics, 2016) (Caiger-Smith, 1973).

Increased trade for Tin resources also provided more access to raw materials. Advances in the chemical and firing processes continued to push the creation of workshops. Soon these workshops could be found in various regions throughout Italy.

Figure 1Principal maiolica centers (Caiger-Smith, 1973)

As the number of workshops grew both in small and larger cities they began to develop their own signature colors, styles, and motifs, further increasing their demand. As production increased, wares were soon traded throughout Europe reaching the various ports along the Mediterranean, and as far north as England. This demand for Italian pottery and its trade mirrored the former Roman Redware "so distinguished are the workshops of the potter's wheel, are carried to and fro across land and sea" (Elder). Along with the increased demand at home and abroad the political geography of Italy, the system of patronage, social habits, and the cultural focus of the Renaissance artistic and scientific ideal contributed to the quick growth of production (Poole, 1997).

The great wealth which was held by individuals and institutions in Italy provided a steady demand for distinct types of maiolica. Religious and secular buildings during the fifteenth and sixteenth

centuries began to order decorated pavement tiles. Personal chapels found at manors began to be decorated with painted tiles as well. These tiles could provide an order large enough to provide work for multiple workshops. One such order in 1523 by an agent for the Duke of Uribino was for 5,000 tiles (Poole, 1997).

Pharmacies, doctors, and hospitals used storage jars, spouted vases, ewers, and bottles and soon these too were being commissioned with maiolica designs.

Religious houses also played an important part in the growth of maiolica production with large quantities of jugs, bowls, cups, and other serving wear for their refectories. These religious institutions also could have a hospital associated with them, and as with the pharmacies multiple items were used and ordered.

As the quality of maiolica developed, it became more fashionable as well to include pieces on the dining table. Up until the fifteenth century most Italian households used ceramics primarily for jugs and bowls preferring other materials such as metal, glass, and wood for other dishes. Soon more dishes made of ceramics began to appear on the table and by the early 16th century even the high households in Italy were place placing orders for goods for their table including plates, platters, salt mills, bowls, cups, jugs, etc. This increased the table service sizes up from around 50 pieces to over 300 pieces (Poole, 1997).

By the 17th century other ceramic decorative artforms such as Iznik, and Chinese porcelain began to enter the European market. This new style began to influence and eventually replaced Maiolica by the early eighteenth century.

Process of Maiolica pottery creation

Much of what is known of the process for creating Italian maiolica comes from a treatise written by Cipriano Piccolpasso in approximately 1557. Born in a maiolica center in Durante, Piccolpasso was a soldier, architect, surveyor, writer, and supporter of the arts. Cipriano as did many at the time would have read the works of Castiglione and their view of an ideal Courtier. One such courtier trait is the knowledge of art such as drawing and painting. Piccolpasso seems to have taken this virtue to heart stating “I would think it a very great misfortune for a nobleman not to be able to put his hand to some art” (Piccolpasso).

Piccolpasso indicates that his treatise was written at the request of Cardinal Francois de Tournon, a patron of physicians, mathematicians, literary, philological, and antiquarian humanism. Despite his claim there is some speculation that this book, while made for the Cardinal may not have been made at his request, and instead created in the hopes of it being sponsored and published by him (Piccolpasso).

Regardless of the reason, the treatise is created in three books and contains detailed directions of the various tools, techniques, and processes used in the creation of maiolica pottery with dozens of drawings as well to further clarify or add additional detail to his words. These books will be the primary source of the process going forward with additional information provided by secondary sources where needed.

Clay

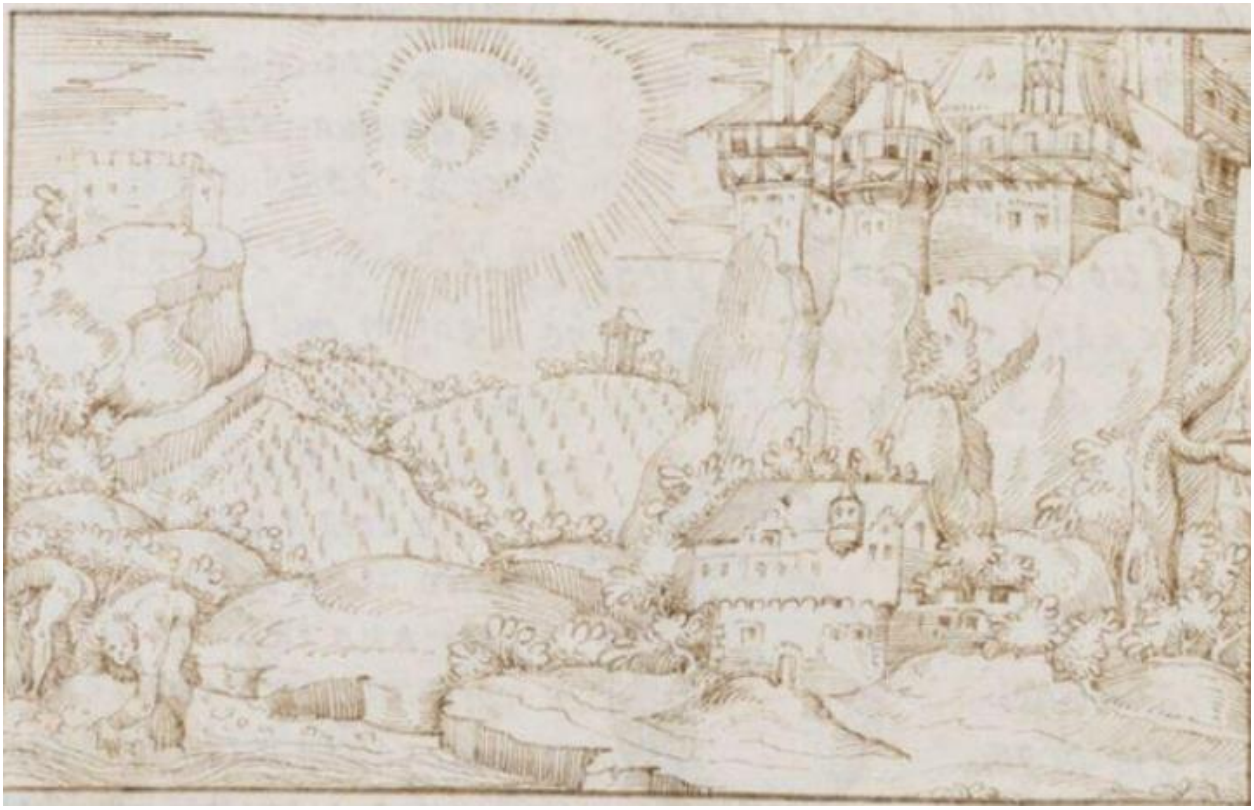

Figure 2 Clay being gathered from Riverside (Li tre libri dell'arte del vasaio, n.d.)

Piccolpasso begins by discussing how the clay was gathered and treated.

When looking for clay “Where the soil is smooth and white and contains genga,…potter’s clay will be got or found, so the oldest practitioner of this most noble art affirm” (Piccolpasso).

Chemical analysis has found that the clay bodies often used were calcareous body, meaning they contain large quantities of calcium carbonite, between 16.3 and 19% in those examined (M. Gulmini, 2015). This high quantity of calcium carbonite would naturally have a lighter and chalky nature matching that described by Piccolpasso. Due to the high calcium content the clay would fire at a near white or light buff color, be light in weight, and would shrink in cooling limiting the crazing, cracks in the glaze, lending it to be an ideal clay for its purpose.

There are two methods which were used to gather the clay.

1. The clay was dug directly from the banks of the river (indicated as the common method when there is a river).
2. Small pits were dug along a hillside with a channel between them. Water was then poured into the pits, or rain filled the pits, and the clay would wash into the pits and was then collected (gathered on mountain sides or other areas without a river).

Once gathered the clay was prepared to ensure it was ready for use.

1. Debris such as roots, leaves and pebbles or any other such debris were removed to ensure the clay was smooth.
2. Clay was then diluted with water and passed through coarse cloth, leather, or fine strainers to further remove any larger debris. This step would remove “pebbles” of chalk, lime, and Marl which can often be found in calcareous rich clay. If not removed these pieces cause small explosions during the firing or later disfiguring the piece.
3. The strained clay was then placed out to dry.
4. Clay was then worked by beating and then kneading.

Once kneaded the clay was ready for use.

Creation of the pottery pieces

Piccolpasso discusses two main methods for creating vessels, wheels, and moulds, both will be discussed below.

Wheel

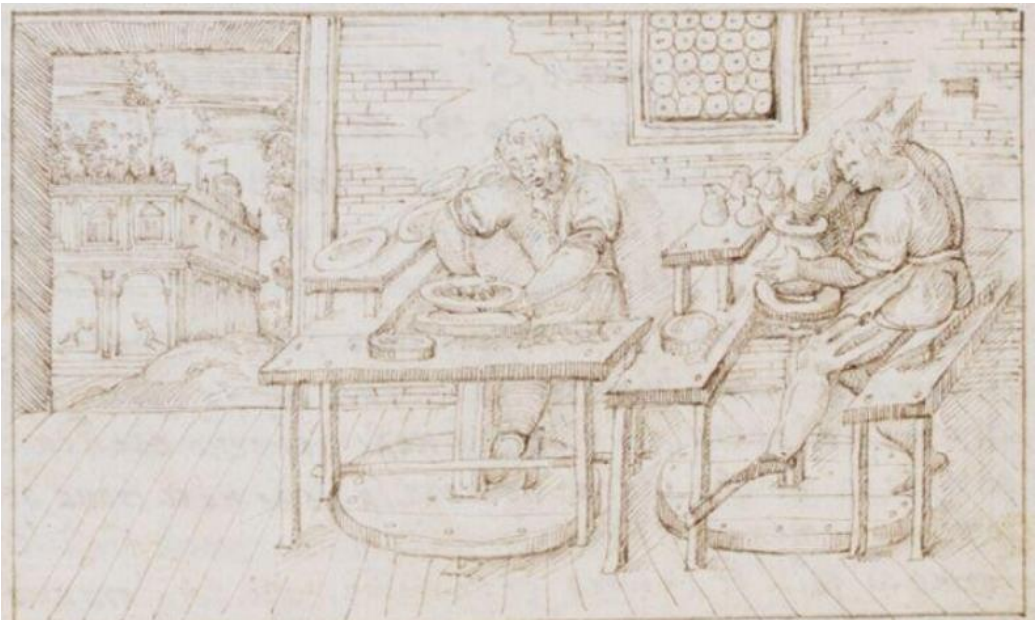

Figure 3 Potters working at a wheel (Li tre libri dell'arte del vasaio, n.d.)

“Now it must be noted that this instrument called the wheel is pushed with one foot and is thus caused to spin swiftly. As the wheel spins so the clay that is place on the mugiuolo or schudella likewise spin, and then pressed with both hands, every kind of ware is made it.” (Piccolpasso)

The wheel allows quicker throwing of all manner of cylindrical or round shapes at a quicker speed than that of building by hand. It is not then surprising that many of the vessels used for maiolica were made on a wheel. Piccolpasso describes a foot powered wheel made of wood with an iron shaft. This wheel type, also known as a fly wheel or kick wheel and is still in use today.

While the wheel may remain nearly the same there are two items the schudella and mugiuolo which to me, were unique. These are convex wheel heads on which the pottery is thrown on. This allows the potter to shape the underside of the vessel and foot in a uniform manner.

Figure 4 Schudella A and Mugiuolo B (Li tre libri dell'arte del vasaio, n.d.)

Once turned and set the vessels are placed on a turning-block and then are trimmed to the proper shape and thickness. This would allow for the potter to throw the piece quicker with less concern for a thin piece as this would be adjusted later.

This section also gives examples of several tools used for making items on the wheel including sticks for measuring the clay amount to ensure consistent pieces, sticks for forming specific shapes, metal irons used for forming rims and feet, and pieces which to place the pottery on (peg, spurlett, stilt) for firing.

Looking at many of these tools, little has changed in the last five hundred years.

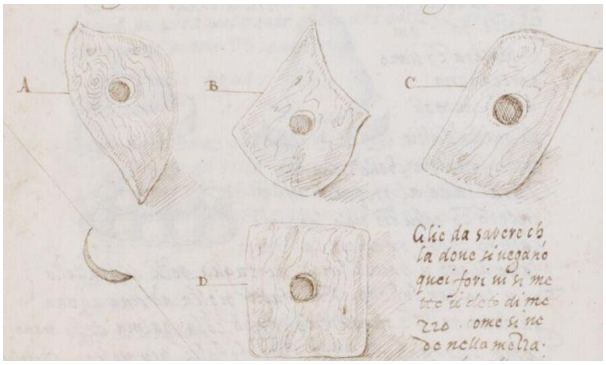

Figure 5 Sticks (Li tre libri dell'arte del vasaio, n.d.)

Figure 6 Modern wooden Pottery ribs

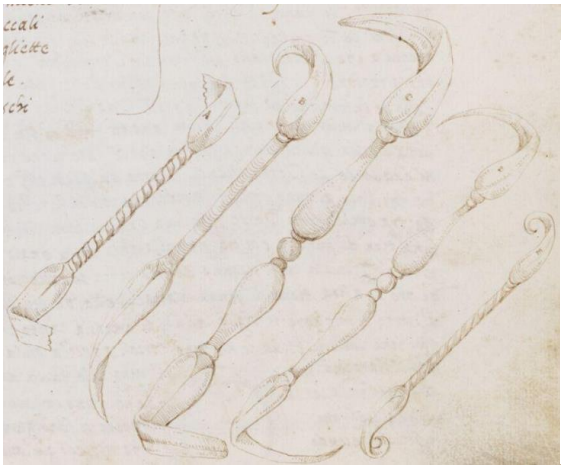

Figure 7 Irons (Li tre libri dell'arte del vasaio, n.d.)

Figure 8 Carving Shaping Knives/trimming tools

Figure 9 A-Peg, B-Spurlett, C-Stilt (Li tre libri dell'arte del vasaio, n.d.)

Figure 10 Modern Stilt

Moulds

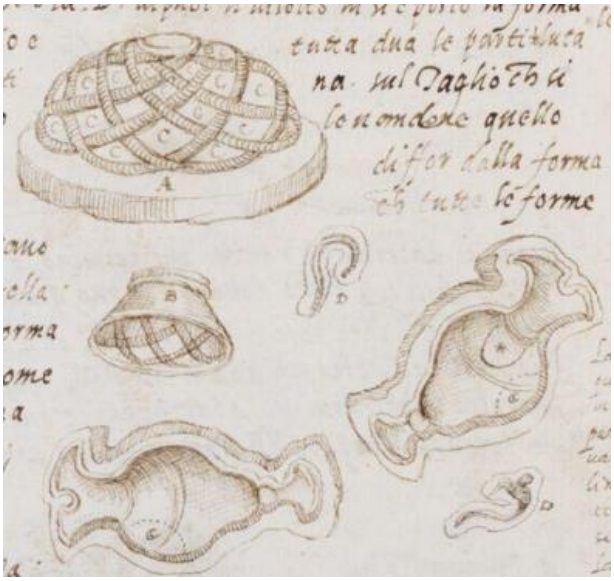

Figure 11 Basket, Ewere, and handle moulds (Li tre libri dell'arte del vasaio, n.d.)

Like the moulds used by potters today, these moulds were fashioned out of plaster of Paris or with a mixture made of flour and Plaster of Paris (Biringucci). The plaster is then poured upon a clay figure and then once it has set the clay figure is removed and the mold is then made.

Moulds can be employed for a variety of non-cylindrical or complex shapes, or where a shape of a specific size/shape was desired with accuracy. Piccolpasso mentions bossed wares, baskets, and ewers as some of the common shapes which moulds were used (Piccolpasso).

To use the mould, clay is first prepared. A large piece of worked clay, called a Pallon by Piccolpasso, is set on a table between two boards of even thickness and then cut using a wire to a set flat shape, known modernly as a slab.

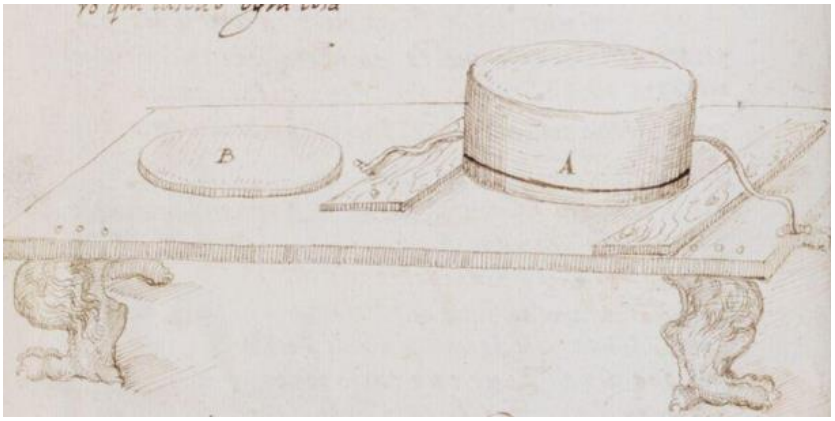

Figure 12 Clay ball (figure A) is cut into a flat slab (figure B) (Li tre libri dell'arte del vasaio, n.d.)

The clay was then pressed into, or over in the case of a basket, the mould. Any clay that presses out of the edges was cut away and the pieces set. Once they were partially hardened slip, a watered-down clay, was applied to the edges and the pieces were then joined together with great care to smooth the seam both on the inside and outside to reduce the chance of the pieces breaking apart as well as leaving a smooth surface for which to decorate.

No matter what the creation style, once the piece was created, handles, embellishment, and even feet were then applied using a slip and placed into the Kiln for the initial biscuit fire.

Kiln and Firing

Figure 13 Updraft Kiln firing (Li tre libri dell'arte del vasaio, n.d.)

The kilns used in Italy during this time were of an updraft variety. In an updraft kiln, the combustible materials are placed in a lower chamber and the pottery pieces are placed in an upper chamber that is then closed. When fired the heat moves from the lower chamber into the upper chamber with the pottery and then up through vent(s) in the ceiling.

The nature of these updraft kilns is that the heat is not trapped, and smoke moves through the chamber. This limits the kiln to use for earthen ware instead of stoneware which was being made in China during that time. Earthenware remains more porous and is more brittle than its higher fired counterpart. The smoke leads to an additional problem, as it can leave a residue of grey or black on the fired piece. While the Romans for their samian ware avoided this problem with specialty-built kilns, this was solved by the Italians by placing the pieces entering the final glaze firing into saggars. A saggar is a ceramic container which the pieces are placed into, and then the container is then placed into the kiln sheltering the pieces from the smoke.

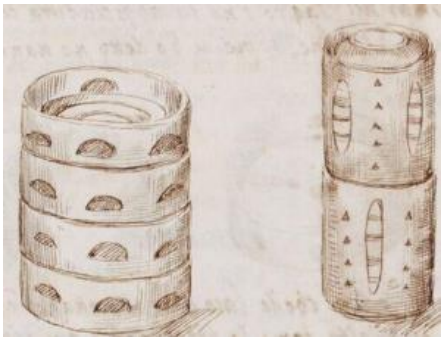

Figure 14 Wares in Saggars (Li tre libri dell'arte del vasaio, n.d.)

The use of saggars as well as the amount of fuel and effort needed to fire a kiln required that pieces be made as uniformly as possible to ensure optimization of room and fit. This is emphasized throughout Piccolpasso's first book as extra attention is given to describing not only the items, but their dimensions (height, diameter, circumference).

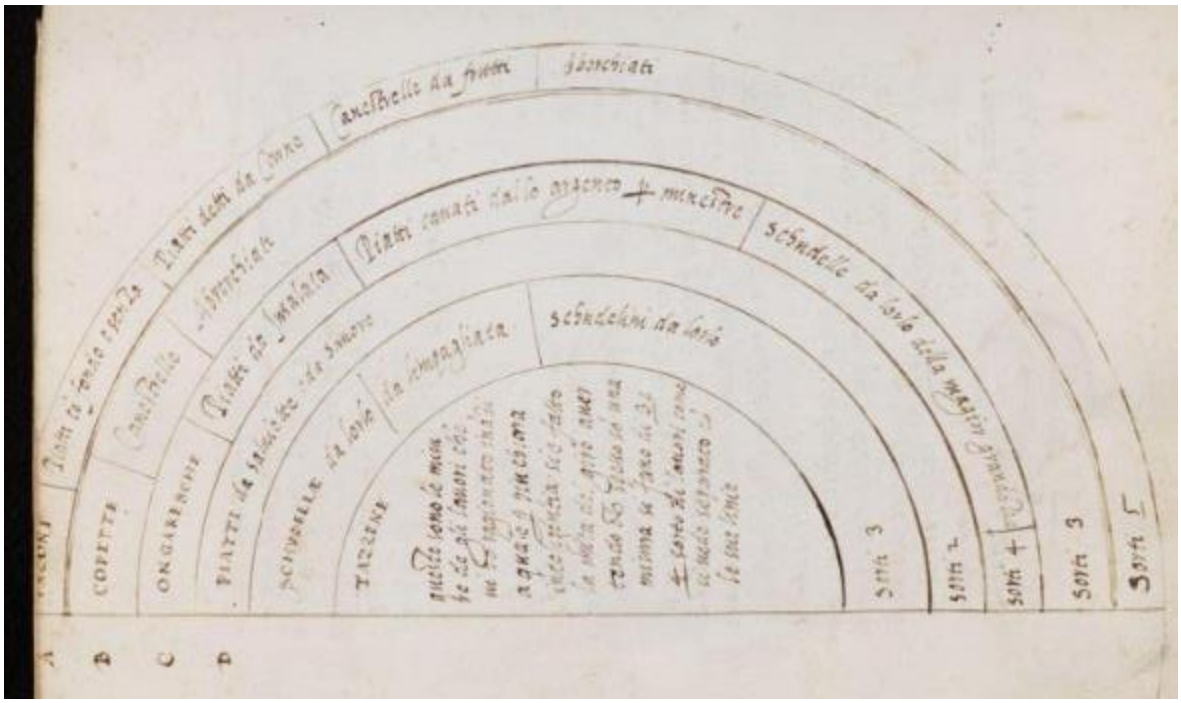

Figure 15 Dimension of Wares (Li tre libri dell'arte del vasaio, n.d.)

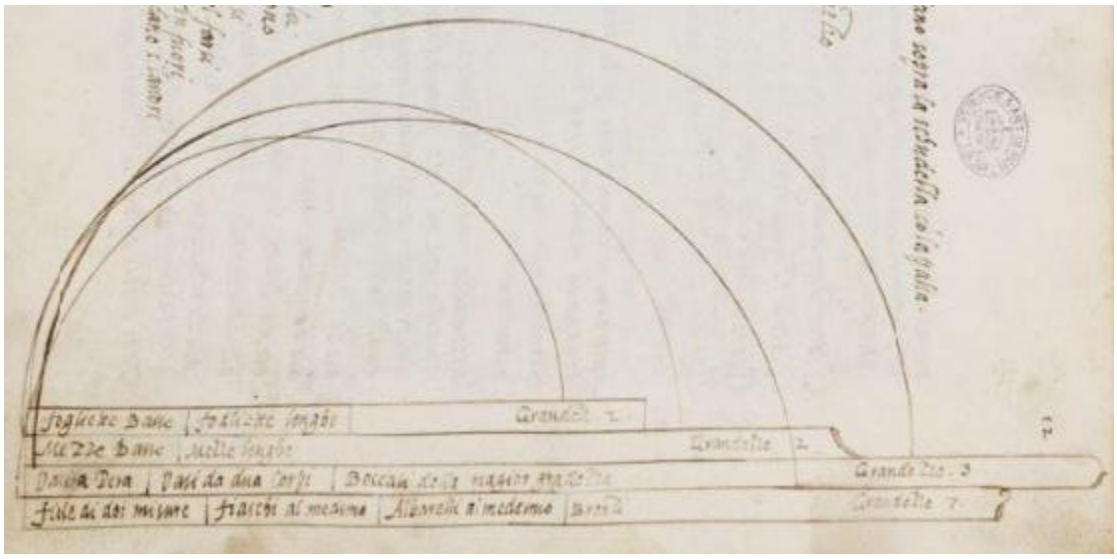

Figure 16 Height and Diameter of wares made on schudella (Li tre libri dell'arte del vasaio, n.d.)

Extra focus was also given on how to best load the kiln, giving directions on what type of items to load where in the Kiln to ensure not only the most efficient use of space, but also proper temperature of the fire based upon the location in the kiln. Earthen jugs of glaze materials needing calcination were placed in the lower combustion chamber. Glazed pieces in saggars were stacked in the beginning of the upper chamber, then coarse ware and then fired pieces are placed in the corners and above and between the saggars.

The temperature of the kiln could be controlled in some measure by blocking or opening the vent holes in various parts of the kiln to direct the heat. Maiolica firing takes place at approximately 1000 C which was judged "by the degree of reflection or 'brightness' of the glaze when a burning stick is held alongside the pots on the end of an iron rod" (Caiger-Smith, 1973).

Tin Glaze and Colorants

While many of the techniques in the prior section have changed little since the Italian renaissance maiolica shops, the tin glaze and colorants have developed much since this time. While some of the ingredients are still used in modern pottery with much more care due to the knowledge of their caustic and dangerous nature, others are no longer used in commercial or even individual firing due to the health risks they entail. Piccolpasso goes into great detail in his second book regarding the creation of pigments, and glazes.

Tin Glaze

The glazes that were used as the base for the painting were prepared from lead, tin, wine lees, salt, and sand or flint. While often the base of the plate was white, it could have a tint of another color to provide a background color which would better suit the design.

Many of the ingredients for the glazes were mixed and calcinated in various stages and various regions or cities had their own variations on these recipes. To prevent repeating what has already been written in Piccolpasso's book the ingredients found in the glazes (Piccolpasso) as well as

those found by electron microscopy and microanalysis (M. Gulmini, 2015) are listed in the below table.

For the table below, it should be noted that marzaotto was created by combining Sand and lees (calcinated) and sometimes salt to form an alkaline frit and tin. The marzacotto is then used in the subsequent recipes. To prepare the tin for glaze it was mixed with lead and calcinated together to form tin ash. Special emphasis was made to describe that the sand used should be as white as possible, indicating a sand that was high in Silica. It is also indicated that the Tin should be of high quality and if possible that from Cornwall England (Piccolpasso). During this time there was a significantly higher trade between Italy and England then there had been in the past, increasing the availability of Tin, though it was still expensive and was rarely used in recipes for common or domestic pottery.

Glaze	**Ingredients**	**Usage**
Marzacotto (clear glaze)*[1]	Sand, lees, salt	Common domestic unpainted pottery
Marzacotta (transparent color glaze)*	Lees, Sand, Azure, Ramina (Copper), (colorants as in the pigment section below)	Common domestic unpainted pottery
Common White*	Marzacott (see above), Tin, Lead,	Surface to be painted
Urbino White*	Marzacotto, Sand, Tin, Lead, Lees Salt	Surface to be painted
White for porringers*	Marzacotto, tin, lead	Porringers for “country folk” which will not be painted
Inside White*	Marzacotto, Tin, Lead	Inside of vessels. This surface is not painted
Ferrarese marzacotto*	Tin, Sand, Salt, Lees	For fine decorated surfaces as it will be applied extra thick and produce a whiter look due to the extra tin
Marches Yellow*	Marzacotto, tin, sand, lees, salt, Lead, Antimony, Iron scales	Surfaces to be painted needing a yellow background
Marches light Yellow*	Marzacotto, tin, sand, lees, salt,, Lead, Antimony	Surfaces to be painted needing a light-yellow background
Marches Greenish Blue*	Marzacotto, tin, sand, lees, salt, Zaffre	Surfaces to be painted needing a green/blue background
Marches Light blue*	Marzacotto, tin, sand, lees, salt, Zaffre	Surfaces to be painted needing a light blue background

[1] * Indicated formula is from Piccolpasso, ** indicates formula is from M. Gulmini

Castello light blue*	Marzacotto, Lead	Surfaces to be painted needing a light blue background
Ravenna White *	Marzacotto, Lead	Surfaces to be painted

The dry glaze ingredients were ground fine in a mill and water added to dissolve the ingredients. This mixture was then poured through a fine sieve into large tub repeating the process several times regrinding any items that are filtered out in the sieve until a fine “milky” mixture remains.

Figure 17 Preparing the liquid glaze (Li tre libri dell'arte del vasaio, n.d.)

This mixture was then reduced to the correct thickness, modernly this is determined by specific gravity, and mixed again just prior to use. The biscuit fired pieces are then dipped into the mixed glaze and after touching up any spots missing glaze set aside to dry. Once dry the pieces are ready to be painted.

Figure 18 Pieces being dipped into glaze (Li tre libri dell'arte del vasaio, n.d.)

Pigments

The pigments derive from various metals and elements: tin, antimony, copper, lead, iron, manganese, cobalt, and mercury. Piccolpasso provides detailed recipes on these pigments and their preparation including calcination as required in his second book. The ingredients found in the color pigments indicated by Piccolpasso (Piccolpasso) as well as those found by electron microscopy and microanalysis (M. Gulmini, 2015) are listed in the below table.

Color Pigment	Ingredients
White*	Tin (calcinated), Lead (calcinated)
Green*	Copper (calcinated), Antimony, Ramina (Copper), Lead(calcinated)
Yellow/Orange*	Iron Scales/Rust (calcinated, Lead, Antimony
Light Yellow*	Antimony, Lead, Lees, common salt
Black*	Burnt Copper, Manganese, Black zaffre
Zaffre (blue)*	Cobalt (calcinated)
Blue**	Cobalt
Brown / Purple**	Manganese
Purple/Red**	Manganese, Iron
Black**	Iron, Manganese

The dry pigment ingredients were ground fine in a mill and water was added to dissolve the ingredients. This mixture was then poured through a fine sieve into a glaze bowl where they were left to stand, and any extra water was then removed until the correct thickness was reached.

Painting

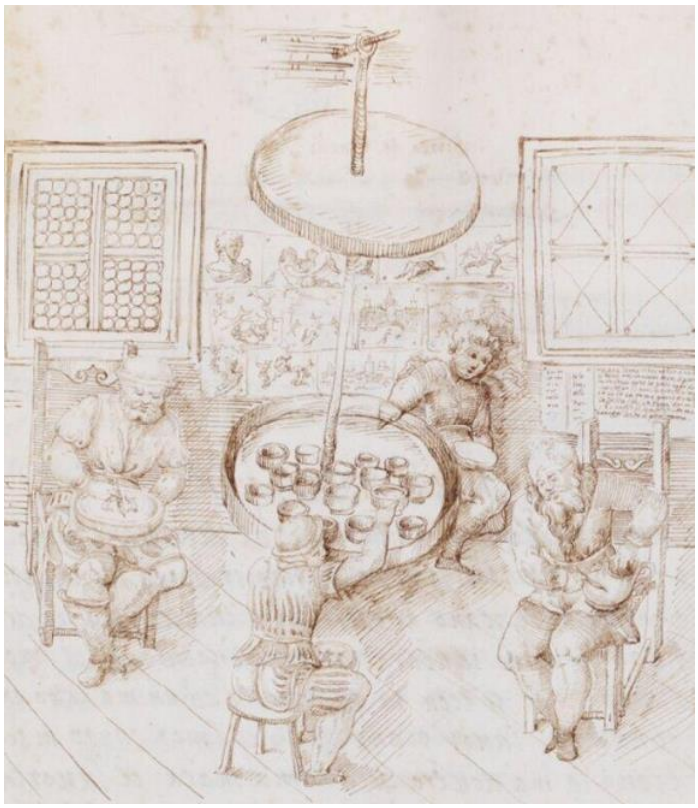

Figure 19 Ceramic artist painting wares (Li tre libri dell'arte del vasaio, n.d.)

In comparison to the attention paid to the other phases of the process, Piccolpasso does not delve into the painting of the pottery as I would have expected. Only the best-known types of designs are

referenced and drawn. He does, however, provide formulas for specific subjects to achieve the desired colors and hues in the paintings.

Subject	Pigments combination
Drawing figures, sketching histories on ships, light, and shade	Yellow, Zaffre
Dawn, dead flesh, rocks in bright light	Light Yellow, White pigment
Timber, roads of reddish hue, rocks	Yellow, White pigment
Sky, Sea, weapons, and other things	Zaffre, White pigment
Ploughed land, roads, antique remains and stones	Yellow, Zaffre, white pigment
Verdant meadows, bushes struck by sunlight	Light Yellow, Ramina (copper)
Hair	Light yellow, yellow
All things red[2]	Armenian bole (red earthy clay), red vinegar, light yellow

Figure 20 Suggested color formulas for subjects (Li tre libri dell'arte del vasaio, n.d.)

While designs could be directly painted on the pottery, this could be difficult as once applied, there was no way to undo a painted section without scraping off the glaze and reapplying. To help with the transferring of images, a method called pouncing was used. In pouncing, a design is drawn onto a piece of paper and thin holes are then placed in the outline. The design paper is then placed on the surface and a small cloth filled with charcoal powder is lightly dabbed on the surface transferring a dotted outline to the glazed surface through the holes. These lines were then used as a guide and the charcoal burned off in the firing leaving no evidence.

Horizontal lines on pots, concentric circles on plates, and spirals were made using a banding wheel or turntable. The piece would be placed in the center of the wheel and the brush applied while the wheel was turned, being certain to hold the brush in place to form a band or slowly moving to form a spiral.

The range of subjects painted goes well beyond those mentioned by Piccolpasso. By the 1500s Italian ceramic artists had begun to impart Renaissance ornament. These pieces moved from stylized drawings and generic figures to entire stories. At the height of Italian maiolica in the 1500s vessels could often be found with scenes from classical mythology, or biblical references (Maiolica Italian Renaissance Ceramics, 2016). Known as istoriato style, these vessels transcended the wares into works of art comparable to their easel painted counterparts. As with other painted art, ceramic artisans were commissioned by the wealthy and elite patrons' coats of arms, personage, and other figures were now enshrined in pieces of art passed down.

[2] Piccolpasso notes that this color is unreliable

Summary / Conclusions

Maiolica is a product of the Renaissance period in which it flourished. The courtier and Renaissance ideals that nobles should be well versed in letters, arts, and sciences. The desire to display wealth through art fueled the growth of industry, while the views on religion and classical works shaped the images that graced their surfaces. Scientific advances in chemistry and the scientific ideal pushed the discovery of the tin and lead base glaze and a variety of colors that until that point had not been seen in ceramics.

Piccolpasso serves as an example of his time and culture. The idea of sharing knowledge, and almost scientific documentation of a process was an ideal of the Renaissance age. Knowledge was to be shared. In his own words, " To those who deem me presumptuous in publishing these secrets I answer that it is better that many should know a good thing than that a few should keep it hidden" (Piccolpasso). While never published in his lifetime the works of Piccolpasso serve as an invaluable guide to the knowledge and understanding of how the process was created. His works and statements are proven accurate through modern scientific methods, leaving the world knowledge of an art form long after he had died, and the form passed out of fashion.

These advancements have a direct impact on what is used modernly today in pottery. While the discovery of lead transfer being dangerous to health has since removed lead as the base for white glazes in the 20th century and the scarcity of other ingredients have caused replacements sometimes in the form of manmade chemicals, many of the colorants such as tin, copper, manganese, and cobalt are still used in pottery today and Maiolica pieces can now be re-created using safer methods. Many of the tools used in the creation of Maiolica pottery and its firing are little changed over five hundred years later, and most of the changes are in the materials they are made from, not the shape or function. A study in this artform has provided me a deeper insight into processes, tools, techniques, and ingredients what surround me today. One of my greatest interests is trying to determine how something developed and through the research in the process and Piccolpasso's book, I was able to unlock another key into modern pottery decorative techniques. It is my hope that like Piccolpasso I am able to share this knowledge so many may know a good thing.

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