A History of the Art of Pottery

The Potter as Alchemist

In many ways, the work of the modern potter mirrors the work of the ancient alchemist. Potters blend earthly materials like clay, stone, and ash, into complicated glaze mixtures. Then through fire, these base substances transform into precious works of art. With glaze chemistry, and one part modern alchemy, potters turn the natural elements we once took for granted into the treasured artifacts we display in our homes and galleries.
It's interesting to see how much the glazing, alchemy, and human life relate to each other. Bernard Leach, author of *A Potter's Book*, helps us understand glazes by relating them to the body. He says most glazes have 3 main parts -the blood, bone, and flesh. Here's how they work:

> **1.) Fluxing agent or "life blood of the glaze" –** causes the glaze materials to melt and flow together in the kiln firing.
> **2.) Refractory or "bone of the glaze" -** resists heat and melting, providing structure and strength to the glaze body.
> **3.) Glass Former or "flesh of the glaze" -** creates complexity, depth and unique qualities.

Similar to Bernard Leach, the early alchemists fused their chemical efforts with the body. Calling their experiments the **Magnum Opus**, or "Great Work," these men searched tirelessly for the right chemical concoctions that would enrich life or prevent death. In some ways, full-time potters do the same through glaze chemistry. They are constantly searching for that perfect potion that will immortalize a clay body and turn sand, water, and ash into gold.

Like alchemy, glazing is often a fiery, messy, and sometimes toxic process. The kiln releases CO_2, the powdered glaze materials are dangerous inhalants, and the heavy metal colorants cause skin irritation. Joel mixes all his glazing in an old boat shed. This dirty, dark laboratory gives him 24 hour access to glaze experimentation, providing the perfect amount of chaos to create beautiful works.

Pottery in Antiquity

The term "pottery" refers to objects made of clay that have been fashioned into a desire shape, dried, and either fired or baked to fix their form. Due to its abundance and durability, pottery is one of the most common types of items found by archaeologists during excavations, and it has the potential of providing valuable information about the human past.

The earliest record of pottery dates back to the Late Paleolithic period in central and western Europe, where fired and unfired clay figurines were created as a form of artistic expression. As

early as 30,000 years ago, at a site known as Dolni Vestonice in the Czech Republic, figurines made of clay mixed with crushed mammoth bone were found.
Evidence of pottery has also been found at an archeological site known as Odai Yamamoto, in Japan, where fragments from one of the vessels have been dated to about 16,500-14,920 years ago.

Open firing techniques were used to produce the earliest pottery. Through this method, temperatures could range from 600-900 degrees Celsius, which are relatively low temperatures.

Firing pottery in a kiln produces much hotter temperature. Enclosing the pottery inside a chamber results in key advantages: the temperatures that can be achieved are higher, last longer, and the heat can be controlled more efficiently. The simplest forms of kilns are pit kilns, which is a pit fire installation where the fuel is placed at the bottom, followed by the pottery, and more fuel in the upper layer. Another type of kiln is an updraft kiln, which is usually a cylindrical construction divided into two compartments: the lower compartment is where the fuel is placed, while the pottery is placed in the upper compartment. This allows the heat to rise and the pottery is fired at a temperature level normally ranging from 1,000 to 1,200 degrees Celsius.
In ancient China, firing techniques allowed temperatures of about 1300-1400 degrees Celsius and even higher in some cases. At these temperatures, the mineral components of clay melt, resulting in a thin, translucent, white vitrified type of ceramic that is known as porcelain. By analysing the chemical composition of pottery fragments, it is possible to determine at what temperature the pottery was exposed, and therefore we can understand the level of technological sophistication of a society, at least in terms of their firing capabilities.

DATING POTTERY IN ARCHAEOLOGICAL SITES

According to the context in which the pottery was found, there are several techniques that can be applied for dating pottery. We can date pottery based on a stratigraphic sequence: this means that during an excavation, archaeologists study the different layers of soil and analyse how the different objects found in them relate to one another. If the layers are undisturbed, then we know that objects found in the lower layers are older than those located in the upper layers. Some of these objects can be dated independently: radiocarbon dating can be applied to human and animal remains and even to charcoal. Pottery fragments may be found, for example, on the same layer where a piece of charcoal is found, and the radiocarbon dates obtained for the charcoal can be extended to the pottery fragments, which provide us with an approximate date for the pottery.

If the pottery fragments found belong to a well-known pottery type (e.g., Chinese or **Greek pottery**, which have been widely studied), then we can date it based on what is known as a typological sequence. There are well-established pottery typological systems for most regions of the world: changes in the surface decoration styles and in the shape of the vessels are

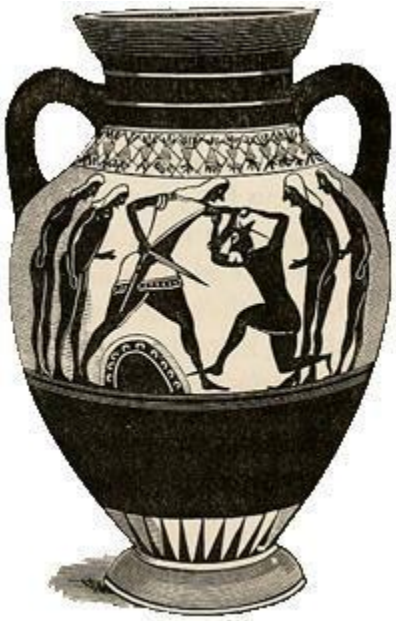
normally gradual, so when we face a pottery fragment that can be related to a well-known pottery typology, then we have a basis to assign a date to the piece of pottery found. Another method than can be applied to date pottery is called thermoluminiscence. This dating method can applied to pottery and other ceramic materials that have been fired and buried in the ground. Thermoluminiscence is often used when no other method is available, mainly because there are restrictions to its application, and its precision is rarely better than +/- 10% of the age of the sample.

Pottery can be used to date archaeological sites. This is especially important at sites where written records cannot offer chronological references, either because they cannot be found or because they remain undeciphered. A famous example is on the island of **Crete**, where Arthur Evans was able to date the excavation of the Palace of **Knossos** based on imported Egyptian artefacts that were found there, including pottery, allowing the researchers to extend the Egyptian chronology into Crete. This brings us to another important aspect of pottery: it can provide evidence of **trade** and exchange networks. During the excavations on Crete, Arthur Evans also proved trade and cultural links between Crete and **Egypt** on the basis that Egyptian artefacts were found in Crete and also Cretan pottery was identified in Egypt.

Pottery can be analysed on the basis of several features. We can look into its shape, type of surface, the colours, drawing patterns, and decorative styles. All these elements, studied in detail for each particular culture and time, can help us to understand the artistic development of a society and may also enable specialists to identify pottery fragments when they are found in places far away from their production centre, again reflecting trade activity and exchange networks.

Ceramics is one of the most ancient industries on the planet. Once humans discovered that clay could be dug up and formed into objects by first mixing with water and then firing, the industry was born. As early as 24,000 BC, animal and human figurines were made from clay and other materials, then fired in kilns partially dug into the ground.

Almost 10,000 years later, as settled communities were established, tiles were manufactured in Mesopotamia and India. The first use of functional pottery vessels for storing water and food is thought to be around 9000 or 10,000 BC. Clay bricks were also made around the same time.



Glass was believed to be discovered in Egypt around 8000 BC, when overheating of kilns produced a colored glaze on the pottery. Experts estimate that it was not until 1500 BC that glass was produced independently of ceramics and fashioned into separate items.

Fast forward to the Middle Ages, when the metal industry was in its infancy. Furnaces at that time for melting the metal were constructed of natural materials. When synthetic materials with better resistance to high temperatures (called refractories) were developed in the 16th century, the industrial revolution was born. These refractories created the necessary conditions for melting metals and glass on an industrial scale, as well as for the manufacture of coke, cement, chemicals, and ceramics.

Another major development occurred in the second half of the 19th century, when ceramic materials for electrical insulation were developed. As other inventions came on the scene-including automobiles, radios, televisions, computers-ceramic and glass materials were needed to help these become a reality, as shown in the following timeline.

The earliest-known ceramic objects are **Gravettian** figurines such as those discovered at Dolní Věstonice in the modern-day Czech Republic. The **Venus of Dolní Věstonice** (Věstonická Venuše in Czech) is a Venus figurine, a statuette of a nude female figure dated to 29,000–25,000 BC (Gravettian industry).[6] The earliest pottery vessels date back to 20,000 BP and were discovered in **Xianrendong cave** in Jiangxi, China.[7][40] The pottery may have been used as **cookware**.[7] Other early pottery vessels include those excavated from the **Yuchanyan Cave** in southern China, dated from 16,000 BC,[41] and those found in the Amur River basin in the Russian Far East, dated from 14,000 BC.[9][42]

Other early pottery vessels include those made by the Incipient Jōmon people of Japan from around 10,500 BC have also been found.[8][43] The term "**Jōmon**" means "cord-marked" in Japanese. This refers to the markings made on the vessels and figures using sticks with cords during their production. Recent discovery places the Incipient Jōmon period start to 15,000 to 11,800 cal bp. Nature: Earliest evidence for the use of pottery. It appears that pottery was independently developed in Sub-Saharan Africa during the 11,000-10,000 BC[45] and in South America during the 10,000s BC.[46]

Pottery is our oldest handicraft. In prehistoric times, most likely water was carried in woven baskets lined with river clay. After the water was poured out of the container the layer of clay dried. The loss of moisture caused the shape to shrink and separate from the sides of the basket. When the clay, now shaped like a pot, was removed, and dried in the sun on hot sand, it retained the basket pattern. Early men and women then discovered that they could harden the molded pottery in hot ashes and make sturdy containers to

transport and store foodstuffs. From these would have been extended the pots formed by hand and decorated with crude tools.

From a very early date in history, some say at least 400 B. C., earthenware pottery was produced on a mass scale by a potter's wheel in many parts of the world. The Egyptians made kilns to place their clay pots in for firing. The kiln was lined with a kind of insulation brick that was made from a mixture of straw and clay which had been dried in the sun. Later, the ancient Egyptians used a finer clay with a high quartz content for their delicate pottery. They rubbed the pieces with a smooth stone to give the dull sheen or coated them with a fine layer of another color of clay.

Further experimentation lead the Egyptians to coat their clay objects with a bluish-green substance to make them non-porous. This was a glaze composed of quartz, soda, and a mineral containing copper which when fired covered the clay bowls and vases with a glass-like surface.

Ancient Greek vases are highly valued for form and decoration. The graceful lines an perfect balance speak to our desire for beauty. The pottery was decorated with pictures of the daily lives of the people and stories of their gods, goddesses and heroes. On the red figure vases the background was painted black and the figures were left the natural red color of the clay. The color was reversed on the black-figured vases

In medieval times sand was mixed with clay to make cooking pots strong enough to be placed over an open fire. Today, for the same reason, casseroles used for baking are made from clay mixed with grog which is a ground-up fired pottery. The openness of grog clay allows water to evaporate more evenly as it dries and prevents cracking and warping during the firing. Grog clay eases the problem of heat expansion which can cause large thick pieces of pottery or sculpture to blow up in the kiln.

Around the middle of the thirteenth century German potters started to produce stoneware. This pottery was made form finer clays and fired at a higher temperature than earthenware. Stoneware was tan or gray in color, strong and naturally non-porous.

Light, transparent porcelain was first produced in China. Porcelain was made from a very plastic and pure clay called kaolin mixed with felspar. The colorful decoration of the porcelain was accomplished by firing each color individually after it was applied. These delicate china dishes and figurines were in demand all over Europe. In their efforts to unravel the secret of the composition of the Chinese porcelain, European and other Asian potters developed many variations in their glazing techniques.

Rakuware is another type of pottery of special interest. The crackled glaze of raku originated in Japan where tea bowls were modeled by hand from a very coarse clay (Hanson, 1970). Late in the sixteenth century, a trade route through Manila, brought pottery from China to Acapulco to Vera Cruz, Mexico to Europe.