

A Literature Review on the Origin of Ceramics

Qu Qiumei

*PhD Scholar, Department of History & Pakistan Studies,
University of the Punjab, Lahore, Pakistan;
Northeastern University at Qinhuangdao, Hebei, China*

Abstract: Archaeological findings suggest that pottery began to appear when nomadic peoples settled down and discovered fire. The pinch pot was probably the first type of pottery. Sedentary ancient people made pinch cans out of clay balls, which they inserted their thumbs into. Objects made by hand using manual skills, now known as handicrafts, are created to meet the needs of their daily lives. Ancient people had to use the raw materials available in their surroundings to make a wide variety of utensils and household items. They must also develop technology that will allow them to be shaped for certain uses. Thus, in the earliest stages, handicrafts, including pottery, were more for practical purposes than decorative ones. From the beginning, ancient people used clay to make tools to meet the different needs of their daily lives. Pottery provided them with useful containers to cook food for people to eat. In addition to their use as household items, pottery products were also used for ceremonial tokens and decorative items. As beauty-loving creatures ("a beautiful thing is always a pleasure"), our ancestors began to beautify their handmade goods, tools, and utensils. They decorate everything they make and even use them to decorate the body.

Keywords: Pottery, Ceramic art, Origin of ceramics

Introduction

It is documented that pottery is one of the oldest and most widely used decorative arts. It can be seen in a variety of places, from ancient ruins to everyday household items. As time went on, they became more and more popular and used for everything from storing liquids to holding food, even an ordinary pot can become a work of art. Where did the name pottery come from? Pottery is derived from the old French word *poterie*, meaning "to be able," and the Latin word *potere*, meaning "to be able." So the word pottery referred to something that could be used in a variety of ways. What type of word is used for pottery? pottery was a noun that had to do with the art or business of a potter. It can also refer to ceramics, such as pottery and stone tools. Being a potter requires being able to combine the art of pottery with the ability to make ceramics.

According to Pakistani historical records, pottery is the art of using tools and techniques associated with sculpture to shape pottery, a type of ceramic material. The word "pottery" can also refer more specifically to clay products fired in kilns, such as vases, plates, and figurines. The history of pottery is long and varied, and the techniques and styles of pottery have changed greatly over time. Pottery has been made for thousands of years, and pottery techniques and styles have continued to evolve. Pottery is generally divided into two main categories: functional pottery and decorative pottery. Functional pottery includes everyday objects such as vases, bowls and plates. Decorative pottery includes objects such as figurines and sculptures made for aesthetic purposes. Depending on the type of clay used, firing method, and decoration, pottery can be further divided into several subcategories. Some of the most common types of pottery include stoneware, porcelain, earthenware, and clay. Pottery is a very old art form, and the techniques and styles of pottery have changed a lot over time. The word "pottery" comes from the Latin word "potus," meaning "beverage." The earliest POTS were probably used to hold water or other liquids. The earliest pottery was probably made in China around 10,000 BC. Pottery was also produced in Japan, Korea and other parts of Asia. Pottery spread to the Middle East and Europe around 6000 BC. The earliest pottery in Europe was made in the Balkans around 4500 BC. Pottery production then spread to Italy, France, Spain and other parts of Europe. Pottery was introduced to Britain about 2000 BC. The style of making the first pottery in England is known as the beaker culture. The earliest pottery in the Americas was made by the Indians around 1500 BC.

Literature Review of Foreign Research

The origin of pottery and the development of ceramics were a long process of gradual development. Potters made clay vessels mostly for everyday use. Pottery technology developed from one place to another through normal trade, wars, and invasions (Flight, G., 1889). In prehistoric times, water was likely carried in woven baskets, (Wensley, D. 2002), the baskets were lined with river mud. After drying, the river mud was removed from the basket and the lining of the clay was transformed into a jar, retaining the pattern of the basket. The molded jars were then placed in hot ash to harden them and used for transporting and storing food.

Neolithic Age (6500-4000 BC)

The oldest Neolithic Egyptian clay POTS are raw and rough. But around 5000-3000 BC, elaborate flowerpots were introduced in the central Nile Valley. The shape of the pottery gradually became artistic, and the surface was better polished and colored. The oldest ceramic works were found in the Middle East between 6800 and 5700 BC. Mesopotamia produced simpler cut black vessels with geometric patterns (Flight, G., 1889).

Cupric Stone Age (4000-3300 BC)

Originally, flower POTS were made on a cushion. Later, the planter production was replaced by a turntable placed on an open field. The potter then left the finished pot to harden in the sun. These turntables are called slow wheels. The earliest wheel casting jars were made in Mesopotamia, Egypt, and South Asia around 3000 or 4000 BC. These wheels are controlled by a stick or a foot, and thinner POTS can be produced in this way. Early pottery was rough in texture and colored with colored clay and pigments. Due to the simple design technique, the design at that time was more bold and geometric (Flight, G., 1889).

Bronze Age (3300-1000 BC)

The Minoan civilization, founded around 3000 BC and flourishing for about 1800 years, was more advanced than the Egyptians because their culture was more liberal. Their POTS are far superior in terms of luminous variations, and the method is novel. In the pottery of the Minoans, the influence of the sea on their race is more reflected. They used bolder patterns of sea creatures. Their clay POTS are decorated with pleasing patterns that reflect the lives and occupations of the islanders. Some jars are also decorated with raised patterns (Flight, G., 1889).

As early as 4000 BC, slippery pottery appeared in the Yangshao culture in central China. The jars and round bowls are decorated with fresh patterns in red and black. Anyang's pottery has engraved decorations similar to those on bronze funerary vessels made between 1523 and 1028 BC (Nelson, C., G& Burkett, R. 2002).

Between 2500 and 2000 BC, a simple method of making glazed surfaces was a major discovery. Between 2100 and 1600 BC, Egyptian pottery was heavily influenced and imported by the Mediterranean countries (Flight, G., 1889).

Domestic Research Literature Review

Scholar Chen Wenping (Chen Wenping, 2003). In his book *Ancient Chinese Ceramics*, he has made a systematic summary of the origin of pottery, that is, in the long ancient time, the primitive people lived by collecting, fishing and hunting, and lived a non-settled life. Later, humans discovered fire, and gradually learned to use and preserve fire, since then, human material life has undergone great changes, began to eat cooked food, from raw food to cooked food. However, at that time, there was no fire resistant painting, can only wait for the fire to barbecue food; Or "stone cooking" cooked food. The so-called "stone boiling method", according to human archaeologists speculate, that is, put human food in a pit with water, and constantly throw hot stones until the water boils and the food is cooked; Or dig a hole, skin the prey, remove the viscera, fill the abdomen with hot burning stones, put them in the hole, cover with hot ash, and eat them after cooking. You can imagine how difficult and inconvenient this is, so there is an urgent need for a container that can withstand fire.

Into the Neolithic age, due to the emergence of primitive agriculture and animal husbandry, human beings began to settle or semi-settled life. In particular, it is of great significance that the occurrence and development of agriculture provided a more stable amount of grains for human beings, and grains gradually became the basic staple food of agricultural tribes. Grains are grainy, starchy substances that are difficult to grill directly over a fire. Meanwhile, leftover food needs to be stored. Because of this, with the development of agricultural economy and the needs of settled life, people have an increasingly urgent need for cooking containers and food storage.

In the long-term labor and living practice, human beings often deal with soil, and gradually found that after mixing clay with an appropriate amount of water, it will be sticky and plastic, and it can be shaped into various shapes by hand, dried in the strong sunlight, and the mud also becomes hard, and it can be dried. Of course, these clay ware because they have not been roasted. Not too strong, easy to break when used, especially in the water to dissolve. However, with the accumulation of long-term fire experience for generations, people have a further understanding of the use of fire. The combination of fire and earth, the needs of social life, which prepared the necessary conditions for the emergence of pottery.

As to exactly how pottery was invented, there is a lack of reliable materials to explain in detail. As Morgan notes in *Ancient Society*, "Gukui was the first person in the nineteenth century to propose the invention of pottery, that is, clay was applied to burning vessels to prevent fire, and then they found that clay alone could achieve this purpose." So pottery came into the world." Engels, in the *Origin of the Family, Private Property,*

and the State, further states: "It can be proved that in many places, perhaps in all places, the manufacture of pottery arose from the coating of dried earth on woven or wooden vessels to make them fire-resistant. In doing so, it was soon discovered that molded clay could be used for this purpose without an internal vessel."

It should be noted that this method of inventing pottery is not the only and universal method. After humans learned to use fire, the earth accidentally fell into the fire and was burned into hard objects, which would inspire the ancestors to try to make pottery at any time. The invention of pottery should be multi-source, and the methods of various inventions will gradually be recognized by people with the deep research of archaeology, folklore, ceramic technology, etc., and the early pottery production is held by women, this custom can be seen from the present Yunnan Jinghong Dai women slow wheel pottery. In female-centered matriarchal society, men specialize in fishing and hunting, while women make pottery.

Wang Rui et al., believed that ceramics are human ancestors with wisdom and creativity, change the way of life, the pursuit of a better life, still true, still good, still beautiful evidence, it is like a milestone in the development and progress of human civilization (Wang Rui et al., 2020).

According to the current research, the earliest clay pottery was produced in the Jomon period of Japan, about 9,000 years ago. It is the earliest art work of arts and crafts, and also provides precious first-hand information for us to study the lifestyle and primitive culture of the ancestors. Jomon culture is named after the jomon on the clay. Jomon earthenware and jomon earthenware objects are almost always jomon ornamented with woven mud strips, dried and baked. The burning method is simple and crude, which is naturally dried by the sun and then stacked on the wood for open firing.

Around 8,000 BC, many parts of Western Asia also gradually entered the Neolithic Age, which was dominated by farming and animal husbandry, including the present-day Iranian plateau, northern Syria and the Anatolian Plateau. In the early Neolithic period when there was no high temperature pottery, we called it "pre-pottery Neolithic culture". In the basin of the Zagros Mountains are scattered the ruins of the Gani Dahle culture of this era. Gani Dahle means "Treasure Valley". Gani Dahle cultural site is a conical hill with a cultural layer of 8 meters, divided into five layers from top to bottom. The bottom layer belongs to the pre-pottery culture stage, and the upper layers have pottery and animal clay sculptures. In particular, some of the large clay pottery found is not fired, and some clay mud strips are around the outer edge of the stone mortar, which is undoubtedly the manufacturing stage. There are also small earthen POTS, small containers in a simple shape. Therefore, the Gani Dahle cultural site was once considered to be the earliest known neolithic site of pottery in West Asia. Of course, the clay at this time is fired at a lower temperature.

By the end of the 70th century BC, pottery firing was common throughout the southwestern region of Iran. The earliest earthenware products are rough and without any pattern in the process, and there are more bowl-shaped objects. And in the blank body mixed with a hemp knife, the purpose is to make it stronger; In the shape is obviously thick, the wall is also thicker. After this, there was the appearance of colored clay pottery, in which the surface of the body was dipped in light yellow clay, and then painted with red clay, mostly geometric patterns. Because of the fine degree and strong adhesion of the clay material, the color pattern of the ancient clay is easier to peel off. Later, standard colored pottery gradually appeared, and its materials were selected, and the surfaces of the utensils were polished, and the process was more exquisite. These include the typical Yermo colored pottery, which is the same as the pottery unearthed at the Yermo site in Mesopotamia, and is also decorated in a slanted raindrop style. Iran's terra cotta history ended around 550 BC. In 1948, a Neolithic site was unearthed in Yermo, Iraq, considered "the world's first rural commune" and "the cradle of civilization." After 6100 BC, this clay pottery was introduced to Yermo from the neighboring region of Iran, so Yermo pottery was decorated with colorful patterns from the beginning. The decoration of colored clay pottery is hung or painted with makeup clay. Makeup clay is a kind of liquid clay, colorful, red and white used more. This liquid clay is dipped or spread on the surface of the clay to form various patterns of decoration. After the Jamo pottery, the pottery of Iraq went through five stages of development: the Hasunas pottery, the Haref pottery, the Obed pottery, the Uruk pottery, the Temtietna pottery and the Nineveh pottery.

Pottery in Egypt began with the Badari culture of the pre-dynastic dynasty, which refers to the period from 5500 BC to 2686 BC, that is, the Badari culture to the Nega culture, and the raw materials of pottery in this period were mostly Nile mud. Most of the fired pottery is black tire coarse pottery, modeling is to imitate the natural plants or grass baskets, etc., the firing technology is very unstable, and there are often problems such as product deformation. In addition, there are a variety of fine thin pottery. Black-topped pottery, in particular, is a feature of this period. With the decline of black-topped pottery, painted pottery developed instead. The clay pottery of this period was influenced by the style of West Asian pottery, and the structure of the decorative pattern was formed. In the early dynastic period, the shape of pottery became more and more simplified, and the method of decoration began to degrade until it disappeared.

The agricultural culture of the Neolithic Age gradually expanded from West Asia to Europe, and European pottery was introduced with the earliest Neolithic culture and agricultural culture. After 6500 BC, the

first batch of agricultural cultural settlements appeared in the Aegean islands, the Greek mainland and the Balkans. It then spread to Western Europe over a period of 3,000 years. "These agricultural cultures that entered Europe basically moved in two directions from east to west: up the Wadar, Danube and Rhine rivers to Hungary in 5500 BC and Germany and Holland in 4500 BC; The other route followed the Mediterranean coast westward, reaching southern France and the coast of Spain about 5000-4000 BC, and finally reaching Britain in the west about 4000-3000 BC. Accordingly, there were early painted pottery cultures in the Aegean region, painted pottery and patterned pottery cultures in the Balkans, linear pottery cultures in the Danube and Rhine valleys, funnel-edge pottery cultures in Central and Northern Europe, patterned pottery cultures in the southern coastal areas of Western Europe, and bowl pottery cultures in northern Western Europe."

The first American agricultural tribes to make pottery appeared in the Mexican highlands of Central America after about 2000 BC. It was the Olmec Indians, who created various animals and gods in clay, that started the pottery civilization in this region. But perhaps the most famous is the Mayan civilization. Such as its painted cylindrical pottery on the performance of the dressed figures, giving a Maya people believe in gods, pay attention to etiquette and have a special artistic expression of the feeling. The Inca culture is regarded as a typical South American culture, and its pottery production is often closely connected with daily life, while not giving up the pursuit and expression of beauty.

The origin and development of Chinese ceramics basically follow two main veins: one is the Yellow River basin, the other is the Yangtze River basin.

The Yellow River basin is a densely distributed area of Neolithic culture, and the remains of the early Neolithic age in China are few. The earliest research data should be the remains of Peili Gang in Xinzheng, Beigang in Eogou, Mixian and Ciishan in Wu 'an.

5500-5000 BC, Peiligang pottery mainly red pottery, the firing temperature has reached 900°C ~ 960°C, raw materials are mud and ash sand two kinds, the wall thickness is not uniform, and the clay soft, may have a significant relationship with the long buried underground moisture absorption. The surface of the pottery is mostly plain, and there are very few milk lines, nail lines, grate lines and scratch lines. There are bowls, bowls, POTS, POTS, tripod and other modeling varieties.

Yangshao culture was found in Yangshao Village, Mianchi County, Henan Province, and got its name. It is mainly distributed in Henan, Shanxi, Shaanxi, the south of Hebei and the east of Gansu Province. Its center is Guanzhong, South of Shanxi and South of Henan. The Yangshao culture dates from about 4515 BC to 2460 BC, during which it has experienced about 2 000 years of history. The Dawenkou Culture was first excavated in Baotou village, Ningyang, Shandong Province, and the excavation site is opposite the Dawenkou River, is two parts of a site, so it is named the Dawenkou Culture. The period is 4040-2240 BC. The Majiayao culture in the upper reaches of the Yellow River dates from 3190 BC to 1715 BC. Longshan culture was first excavated in Chengzi Cliff, Longshan Town, Zhangqiu, Shandong, and later found similar remains in Henan, Shaanxi and other places, but with the cultural appearance of Shandong is different, is inherited from the Yangshao culture of many factors developed, the time is 2310-1810 BC, about 500 years of history. The development of Shandong Longshan culture is inseparable from the factors of inheriting the Dawenkou culture, which is mainly distributed in Shandong, northern Jiangsu and Liaodong Peninsula, from 2010 BC to 1530 BC.

The Neolithic culture in the Yangtze River Basin was also quite developed at that time. At present, Daxi culture, Qujialing culture, Hemudu culture, Majiabang culture and Liangzhu culture have been found.

The Daxi culture was first discovered in Daxi Town, Wushan, Sichuan Province, and was distributed in the Three Gorges area and along the Yangtze River in western Hubei Province from 3825 BC to 2405 BC. The pottery of Daxi culture is mainly red pottery, with a certain amount of black pottery, gray pottery, and even a small number of white pottery, and the firing temperature is about 600°C ~ 800°C.

The Qujialing culture is named for its discovery in the Qujialing area of Jingshan, Hubei Province, mainly in Jiangnan region, from 2550 BC to 2195 BC. In the pottery of Qujialing culture, there were more black pottery in the early period and less red pottery, and the output of gray pottery increased in the late period, accounting for an important position. There were also some painted pottery and red painted pottery, and the firing temperature was about 900°C.

The Hemudu culture was discovered in Yuyao, Zhejiang Province. It dates from 4360 BC to 3360 BC, and is now found in Ningshao Plain, south of Hangzhou Bay. The grey and black pottery is a remarkable relic of Hemudu culture, besides, there are also sand and clay grey pottery. The firing temperature is: black pottery 800°C ~ 930°C, gray pottery 800°C ~ 850°C.

Liangzhu Culture was first discovered in Liangzhu, Hang County, Zhejiang Province, and its distribution was roughly the same as that of Majiabang culture. The period is 2750-1890 BC. The characteristics of Liangzhu culture are muddy black pottery, but most of them are gray tire black Yi pottery, and there are a few thin tire black pottery, similar to the eggshell pottery of Shandong Nishan culture, in addition, there are muddy gray pottery and sand red pottery. Clay clay is often coated with a reddish-brown coating on the surface. The firing temperature of pottery is 940°C.

In addition, China's Neolithic pottery in the southeast region, the southwest region, the northern prairie area are found, it can be seen that the development of China's pottery at that time prosperous, style characteristics according to different regions and different. Since then, China has experienced the class society of various dynasties, and the development of ceramics has not been interrupted, but the development of one peak after another, pushing ceramics to the top of the world and achieving the brilliance of the Chinese nation. In this long history, it must be mentioned that the emergence of primitive celadon (grey-glazed pottery), about in the middle of the Shang Dynasty, China in the practice of firing printed hard pottery and white pottery, on the basis of continuous improvement of raw materials, improve the firing temperature and glaze technology on the surface of pottery, practice created primitive celadon. Making porcelain requires three conditions: the selection and processing of raw materials to make the fetal quality white; After 1 200°C above the high temperature, the fetal density; The use of high temperature glaze makes the fetal glaze bond tightly. Although the original celadon is not so perfect, it still belongs to the gray glaze pottery, but it has basically met some requirements of porcelain: its raw materials and glaze formula can withstand high temperature firing, at such a temperature, the object does not deform, indicating that the raw material formula is reliable; The combination of the glaze and the tire is firm, indicating that the glaze is successful.

The production of primitive celadon laid a solid foundation for the production of China's Han Dynasty porcelain. The production of porcelain in the Eastern Han Dynasty was developed from the primitive celadon. For a period of time, the shape and decoration methods of Eastern Han porcelain were inseparable from the style of the original celadon. Through the improvement of raw materials, the improvement of glaze formula and the improvement of kiln structure firing technology, the Eastern Han porcelain gradually formed the advanced level in the world. Its production is the result of the long-term practice of Chinese ancient people, is the crystallization of wisdom and wisdom, is the contribution of our ancestors to human civilization, is an important milestone in China's ceramic history, but also a brilliant peak in the history of ceramics in the world. Since then, ceramics and China have forged an indissoluble bond in the hearts of people around the world.

Throughout the history of the development of ceramics in the world, from the current archaeological data, Japan, Iran, Iraq, Europe, China, Egypt, the Americas have Neolithic pottery remains, the earliest of which is Japan. However, the development of pottery technology in Japan was slow for a longer period of time, from the Jomon period to the Yayoi period to the Nara period in the 5th century AD, clay pottery accompanied the hunting life of Japanese primitive people for more than 10,000 years. When Chinese pottery technology was introduced to Japan via Korea, Japanese clay ware entered the early pottery stage. This time was the high Tang Dynasty in China. Around the Ming Dynasty, Koreans gathered in Japan by Lee Sampyeong, a Korean potter, moved to Arita, started mining and making porcelain, and fired white and blue and white porcelain, thus Japan had porcelain. Europe produced porcelain almost in the Ming Dynasty of China, Korea probably produced porcelain in the Song and Yuan dynasties of China, and Iran, Iraq, Egypt and the Americas later. This is basically the development of world ceramics before the Qing Dynasty in China. However, in the following hundred years, the world's ceramic industry has undergone earth-shaking changes, China's advantages in the ceramic industry gradually weakened, and Germany and other European countries, Japan and the United States of America's ceramic industry have developed, jumping into the world's prominent position.

In his book "Appreciation and Ornamentation of Chinese Ceramic Art", scholar Cui Bin systematically expounds the origin and development of pottery in the prehistoric period, pre-Qin period, Qin, Han, Wei, Jin, Southern and Northern Dynasties, and later Tang, Song, Yuan and Ming periods.

Pottery in prehistoric times was made in three main ways, namely: woven fabric forming, kneading and molding.

By means of the specific operation of the method of braid molding, that is, the clay is first applied to the bamboo and rattan woven baskets and baskets, and then burned to form containers that are not easy to leak, and later, there are pottery that can be molded directly with clay and fired without baskets or baskets. Many scholars have expressed different views on this statement, and conducted simulation experiments, that using this method to fire pottery, and eventually only get a pile of rubble. Therefore, primitive people should not have originally invented pottery by applying mud on the inside and outside of woven containers such as baskets and baskets.

With the deepening of people's pottery skills, people believe that the method of human invention of pottery should not start from the production of large objects, but should start from the hand molding of small objects. In the long practice of social life, the primitive ancestors realized the plasticity of clay and began to gradually and consciously knead some small objects by hand. Such as plants, captured animals, their own commonly used daily necessities. In fact, during the upper Paleolithic period, humans had already begun to make some animal figures out of clay. For example, the clay statues of bison and bears found in sites belonging to the Magdalene culture in the Paleolithic Era in Europe, and the clay and fired animal statues and female statues unearthed in the former Domi Vislonis hut site in Czechoslovakia are all good examples. This shows that before making pottery containers, humans already knew how to use clay to shape simple small items, and found that these clay products will become stronger after fire, and are not afraid of water, so they began to use clay to shape practical daily necessities. In terms of process technology, kneading method is much easier than forming with woven baskets and baskets, and it is also easier to fire molding.

As people became more and more skilled in the art of pottery, It was realized that human beings could not know how to roll the clay into mud strips to make pottery at the beginning, but to make mud sheets first, and then use the mold as a support to layer the mud sheets on it, when the mud wall is layer by layer to a certain thickness and height, and then remove the mold, and continue to form the clay material may also be pieced into a shape, and then splice the synthesizer. So what was the original mold made of? It is most likely made from the shells of certain plants found in nature, or from containers made of bone or stone. Because before the invention of woven containers, people have begun to use the shells of certain fruits in nature as containers, such as water drawers and storage containers for storing items. Using the fruit shell as a container to contain liquid is not easy to leak, and the fruit shell is approximately round or semi-circular, and the surface is smooth, which provides the most natural and convenient "mold" for pottery with clear soil. Only after the transition stage of first removing the mold and continuing to shape, can it be developed to the pottery stage that can be directly formed without mold. According to the survey, at present, in some places in Zhejiang, there is still the method of using clay sheets attached to the inner mold to make pottery, but the inner mold is removed immediately after forming. Only on the basis of long-term practice of pasting, plastering, coating, plastic and other technologies, can pottery braided fabric, wood bone, etc., is different, afraid of fire, plasticity is relatively poor, if the soil is applied to the braided fabric and then burned, the final result is because the braided fabric is not resistant to fire, resulting in the cooked soil is easy to break at high temperature, it is difficult to form. Therefore, the invention of pottery is likely to start from the kneading method, and then there will be the appearance of molding methods such as applying mold, mold mud, mud sheet construction, mud strip construction, mud sheet encircling method.

In short, the production technology of pottery has experienced a long development process, that is, it has gone through a simple and crude, gradually developed to a complex and delicate process, and the shape of pottery is more and more diversified, and the decoration is more and more colorful (Cui Bin, 2019).

Conclusion

Ceramics as one of the oldest and most widely used decorative arts, artisans have accumulated skills and knowledge through years of practice. The accumulated skills are then incorporated into each artifact he or she is creating. The time spent on craft-related activities (such as cutting, shaping, shaping, painting, dyeing, etc.) shows the level of expertise and skill of the craftsman. The accumulated skills are then passed on from generation to generation. The techniques and skills of handicrafts are taught to the apprentices by the master over and over again through observation, imitation, learning and practice.

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