

THE COMBINATION OF PHILOSOPHY AND MATTER

-Ancient Chinese gold and jade

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Abstract: Ancient Chinese jade, ivory and gold and silverware are treasures of traditional craftsmanship, each with its own unique charm. Jade is famous for its warm texture and exquisite carving. Since the Neolithic Age, it has carried rich cultural connotations such as etiquette and morality. The shape has developed from simple jade and jade cong to complex and diverse figures and animal shapes. The craftsmanship covers relief and through carving, etc., reflecting the ancient people's respect for the natural beauty of jade and the pinnacle of carving skills. Ivory ware, with its delicate texture of ivory, shows the ultimate fineness in carving, and is often used in study utensils, ornaments, etc. Its production reflects the high level of ancient craftsmen's micro-carving, and is also influenced by the aesthetics and social customs of different dynasties. The gold and silver wares are highlighted by the gorgeous luster of precious metals, and they integrate various techniques such as casting, hammering, and inlay in the production process. From practical wares to decorations, they not only reflect the luxurious life of the royal family and nobles, but also contain beautiful meanings such as auspiciousness and wealth. Their shapes and decorative styles continue to evolve with the changes of the times, providing a vivid portrayal of the development of ancient social economy, culture, and craftsmanship.

Keywords: Jade Ware Processing, Ivory Carving, Hammering of Gold and Silver Wares, Material Characteristics, Historical Process

overview

Jade has a long history and profound cultural significance in Chinese culture, and is widely loved and cherished. Europeans and Americans have a lower liking for jade than Chinese, which is mainly due to cultural nuance. In China, jade has a deep cultural tradition and symbolic meaning, and is regarded as a symbol of auspiciousness, nobility and perfection. Golden jade, golden mouth jade, golden branches and jade leaves, jade is always together with gold, a precious or beautiful thing, is considered to bring good luck and blessing. Therefore, the use of jade and gold to make jewelry and ornaments also holds people's yearning and blessings for beauty. However, in European and American cultures, gemstones such as diamonds, ruby and sapphire are more popular, they represent luxury and status. The Chinese people's love for jade not only stems from its aesthetic characteristics, but also from the profound philosophical and cultural connotations carried by jade in Chinese tradition. The Chinese people's use of gold and jade has spanned from the primitive era to modern times. The craftsmanship, patterns, shapes, and other decorative styles of gold and jade artifacts in various historical periods comprehensively reflect the social and cultural features and aesthetics of those eras, thus containing rich historical and cultural information. In addition, almost from the very beginning when gold and jade were first used by people, due to their unique textures, they became symbols of social status and rank in ancient Chinese society. In

ancient society, there were strict regulations regarding the gold and jade artifacts worn by people of different ranks, covering aspects such as materials, shapes, patterns, forms, sizes, and even the body parts where they were worn. This was an integral part of traditional etiquette and laws.

Both the Confucian cultural system and the Taoist cultural system hold gold and jade in high regard. According to Taoist theory, gold and jade, substances formed over hundreds of millions of years, are embedded in nature, integrating the essence of the sun and the moon. They are the crystallization of the vital energy of heaven and earth and are also peaceful and natural substances that are in harmony with nature. This aligns with the Taoist concept of pursuing the way of nature and living in accordance with it. Confucius in the Confucian school said, "Jade represents the harmony of benevolence." He believed that jade possesses five noble virtues: benevolence, righteousness, wisdom, propriety, and faithfulness. Jade is pure and gentle in texture, maintaining its quality even when surrounded by stones, and it also has the characteristic of toughness. Gold, on the other hand, is precious and rare, symbolizing the noble imperial power. It also has the qualities of solidity and purity, and is used as a metaphor for people's moral cultivation. It advocates that a gentleman should always maintain inner purity and firmness to resist all external temptations. Promises that are as valuable as a thousand pieces of gold and the spirit of "rather be a broken piece of jade than a whole tile" are not only qualities that a gentleman should possess but also symbols of the national spirit. Therefore, the qualities of gold and jade are widely loved and respected among the literati class and have become symbols of perfect virtues.

In the philosophical system of traditional Chinese culture, jade is a carrier with a long historical heritage, rich cultural connotations, and multiple symbols. People from different social classes and identities have different beautiful expectations and spiritual sustenance associated with gold and jade artifacts. Through wearing and using gold and jade artifacts, people gain corresponding understandings and follow corresponding etiquettes. It can be said that the classes and etiquette norms represented by gold and jade reflect the understanding of etiquette within the feudal hierarchical system and the Confucian knowledge system. People's emphasis on and love for gold and jade artifacts also reflect their yearning for good qualities and a better life, as well as their external materialized recognition of the philosophy of traditional Chinese culture.

1、Rituals are produced because of jade, and the wisdom of the ancients wearing jade:

The history of worshipping jade can be traced back to the Neolithic Age, which is seven or eight thousand years ago. Since ancient times, people have made and used jade as a ceremonial vessel for worshiping gods, not just as an ornament, but because people wear jade not just for its decorative effect, but to pray for the blessing of the gods. It is also because of this that people also set up a large number of jade utensils in tombs to accompany the tomb owner and to protect the tomb owner from eternal life and bliss. It can be seen that jade has profound cultural and religious significance in traditional Chinese culture, and is considered to have the role of warding off evil spirits, praying for blessings and showing status.

In the ruins of the Neolithic Age, such as Hemudu Culture, Hongshan Culture, Liangzhu Culture, etc., a large number of jade artifacts have been unearthed, indicating that the jade production technology at that time was quite mature. In some high-level mausoleums

unearthed, a large number of jade artifacts have been unearthed, and the types are quite rich. There are jade cong and jade huang for sacrifice, jade masks for burial, and jade necklaces. It can be seen that jade artifacts have been used for sacrifice, decoration, and symbolize high-level social status. At this time, the jade processing has also had a high technical level. The yellow jade dragon unearthed in the Hongshan Cultural Site has a round shape and a harmonious proportion. On the slender curved jade decoration, the shape and line carving decoration of the head part are very fine. In the Dawenkou cultural site, exquisite jade bracelets, rings and string ornaments were also unearthed. At the same time, ivory combs, ivory cong and other products unearthed have been inlaid with turquoise, which shows the production and processing technology of jewelry at that time.

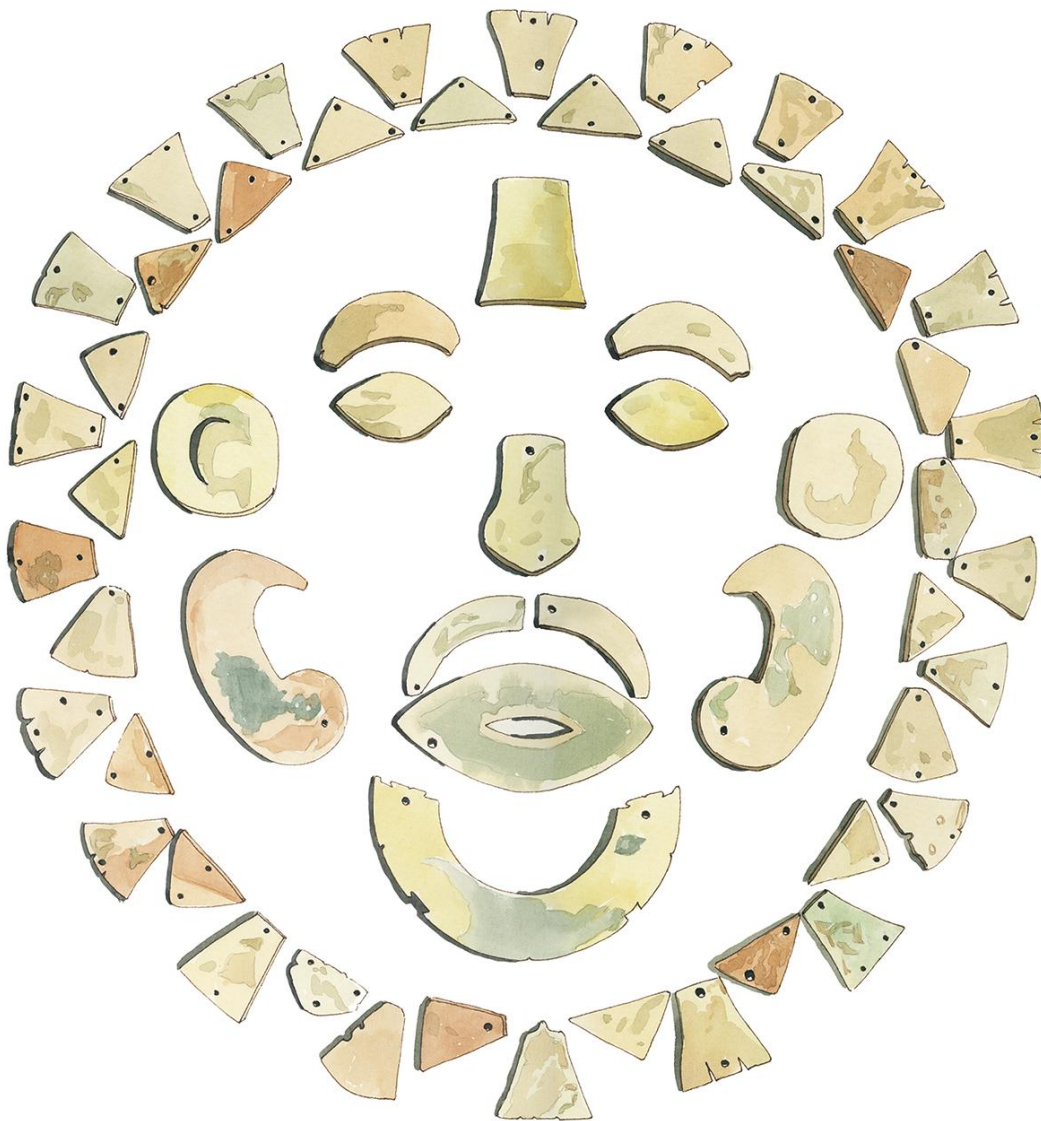


Figure 1: Western Zhou, embellished jade mask

During the Xia, Shang and Zhou Dynasties, the craftsmanship of jade was further developed, and jade was given more political and cultural significance. At this time, the technical level of jade production has been greatly improved. In addition to being used as

ceremonial utensils and funeral items, it has also begun to be used more by the royal family and nobles as daily ornaments. The Book of Rites records that "a gentleman does not go without a reason," which means that if there are no special circumstances, a gentleman should wear jade ornaments with him, because in traditional Chinese culture, jade is respected by mainstream culture as a symbol of noble quality. But the jade referred to here is not a jade pendant of later generations, but an accessory set up in groups, hanging in front of the chest and abdomen, and sagging down to the legs. The chest and abdomen accessories unearthed in the Western Zhou Dynasty are made of jade rings, various curved jade pipes of different sizes, agate, refined coal and many other components of different materials, and at most hundreds of components are strung together. Not only are there many components, but also the combination is fine. These components composed of many jade parts, worn on the person, swing and collide with each other as the person moves, making a sound, so people are required to move slowly and not move too much, naturally showing an elegant posture. It can be seen that the jade ornaments worn in groups at this time are not only a ceremonial device to show their identity, but also play a role in controlling their walking gait and keeping people balanced and elegant. This also opened the first river to control people's actions with ornaments, and was inherited by future generations, which can be said to be the wisdom of the ancients.

It can be seen that there are already craftsmen or workshops making jade, specializing in the production of various jade items. There are nearly 600 pieces of jade unearthed in Fuhao Tomb in Yinxu, and 1,300 pieces of jade and stone unearthed in the Western Zhou Tombs in Rujiazhuang, Baoji, Shaanxi. The jade unearthed in these tombs has both tools, such as jade knives, jade daggers, weapons such as jade gongs, and ritual items such as jade huang and jade gui, and more accessories. By the late Shang Dynasty, there were more types of jade, and the production was particularly exquisite.

The Kneeling Jade Man in the Tomb of Fu Hao is considered to be one of the representative works of Yin Shang plastic art. It is a jade carving artwork of the late Shang Dynasty unearthed from the Tomb of Fu Hao in Yinxu, Anyang, Henan Province in 1976. The Jade Man is 7 centimeters high, carved from yellow-brown jade, and is made of selected Xinjiang Hetian jade materials. This material is hard and delicate in texture, which requires extremely high carving skills. The Jade Man adopts three-dimensional round carving techniques and is decorated with line engraving to show the image of a figure who is kneeling. The Jade Man has a long and narrow face, thin eyebrows and big eyes, a wide nose and a small mouth, and a solemn expression. The figure is wearing a long collar robe, the sleeves are narrow and long to the wrist, the waist is wide, there are long "knees"(Bi xi) hanging in front of the abdomen, the shoulders are decorated with animal patterns in the shape of ministers, the right leg is decorated with S-shaped snake patterns, and the back is inserted with a wide handle in the shape of a cirrus cloud, and the overall bearing is graceful. The ornaments on the jade man are beautiful and the clothes are gorgeous, especially the wide handle-shaped utensils worn at the waist, which have a special shape. The crown of the jade man is particularly peculiar, much like silk products. The difficulty of carving the jade man kneeling in the tomb of Fuhao lies in its comprehensive requirements for materials, technology, details, artistic expression, cultural significance and innovation. The jade man's expression is solemn and solemn, the clothing is gorgeous, and the ornamentation is exquisite.

All these require the sculptor to possess profound artistic accomplishment and creativity.

2. The top jade ware used for 400 years - golden thread jade clothes

At this time, not only some shapes of jade were fixed, but also some shapes, patterns, and corresponding meanings of jade were relatively fixed, which were followed for thousands of years. For example, the embellished jade mask unearthed in the tombs of the Western Zhou Dynasty was composed of many jade pieces. There were perforations on the small jade pieces, which were built according to the image of the human face and connected together to form a mask, covering the face of the tomb owner. This practice of using jade to protect the deceased, in the "Zhou Li" on the use of jade in the emperor's tomb has detailed regulations: "Cungui, Zhang, bi, Hu, Huang's canal eyebrows, Shubi Cong to underwrite the corpse", we know that the jade Huang is placed on the feet, the jade is placed on the back, the abdomen is placed in the jade cong, the fine provisions can be seen, but also in the highest level of the emperor's tomb using a large number of jade, at that time has formed a set of rigorous ritual system, but also for the Chinese ancient tomb civilization followed by the Chinese high-level tombs of the necessary burial goods, but also the ancient jade in the most cattle jade products thus born, that is, golden thread jade clothes.

According to Xijing Magazine, emperors of the Han Dynasty were buried with "pearl jade boxes," which were shaped like armor and connected with gold wires. This "jade box" is what people call golden thread jade clothes in daily life, and was used as a noble ceremonial vessel and a symbol of status.

The golden thread jade clothes are made up of many jade pieces and metal wires (gold, silver, copper or silk strands). The jade pieces of the jade clothes are green, gray-white, light yellow-brown, etc. The jade clothes are all composed of Xinjiang Hetian white jade and sapphire, which are warm, crystal clear and translucent. The golden thread jade clothes are divided into headgear, face cover, front and rear pieces of tops, left and right sleeves, left and right gloves, left and right trousers and left and right foot covers. The appearance is the same as that of the human body, and each part can be separated, similar to modern clothing. The Han Dynasty believed that jade could immortalize the corpse, so the golden thread jade clothes were not only a status symbol, but also reflected the ancient pursuit of immortality.

Each piece of jade clothing is customized according to the ratio of the human body 1:1. The jade worker may first make a wooden model that is the same as the human body, and draw vertical and horizontal rows on the model according to the different parts of the human body to determine the size and shape of the jade piece. Then there is the processing of jade: the jade is sawed into different-sized flakes according to the shape delineated on the model, with a thickness of about 0.2-0.35 cm. Then, the sand drilling method of sand grinding is used to drill holes in the corners of different parts of the jade piece. Some holes are only 1 mm in diameter. Each jade piece should be polished 360 degrees without dead ends to show the luster of the jade.



Figure 2: Han Dynasty, Animal face pattern sapphire auxiliary head

At the same time as the processing of the jade sheet, the "golden thread" should be made. The gold is first beaten into gold sheets, then cut into filaments, and finally several strands of gold wire are screwed into a strand of combined gold thread, similar to the method of cotton thread spinning into yarn and then weaving into thread. According to the finished product of the golden thread, it is speculated that the heat treatment process of annealing may be used during the processing, so that the diameter of the cross-section of the gold wire is only 0.08-0.14 mm. After the gold wire is made, it is woven together by different methods such as cross-type, set-type, parallel-type and connection-type according to different parts of the jade coat. According to the records of the "Post-Han Book · Etiquette Chronicle", the jade clothing system clearly divides the three grades of golden, silver and copper strands according to the different status grades.

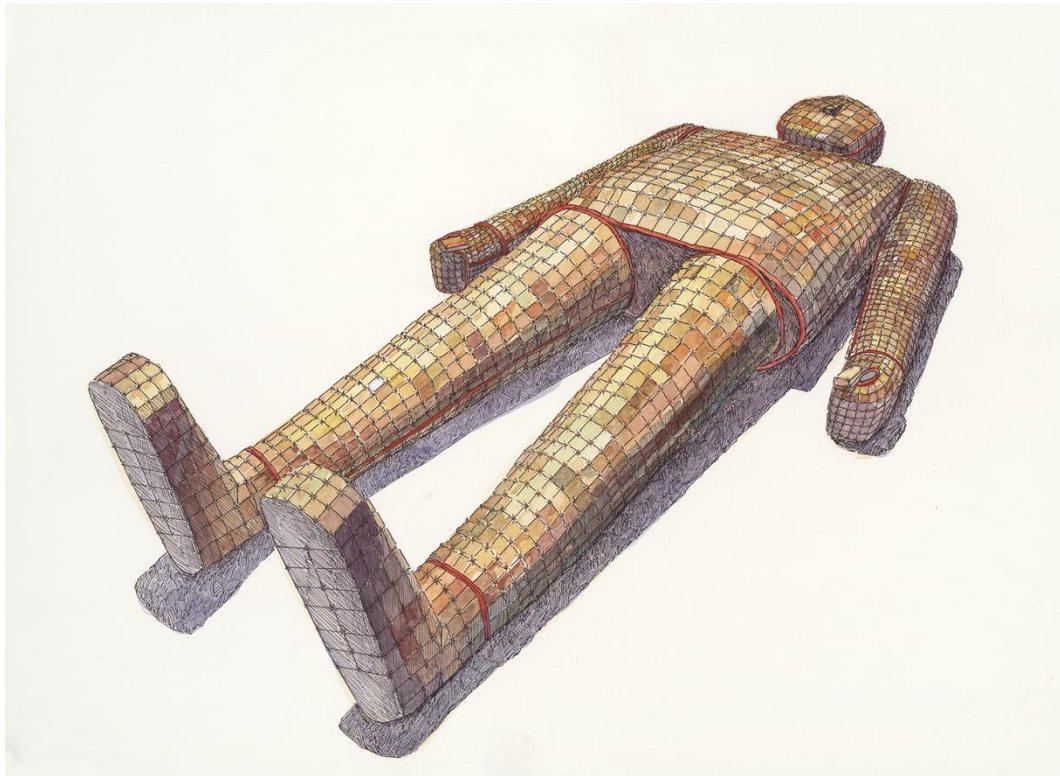


Figure 3: Han Dynasty, Golden Thread Jade Clothes, Xuzhou City, Lion Mountain, Chu King Tomb Unearthed

Golden thread jade clothes were the funeral clothes worn by emperors and high-ranking nobles in the Han Dynasty (206 BC-220 AD) after death, and their appearance was the same as that of the human body. Golden thread jade clothes have been found in many Han Dynasty tombs, among which the famous one is the golden thread jade clothes of Zhongshan Jingwang (Local vassal kings) Liu Sheng unearthed from the Han Tomb in Mancheng, Hebei Province. The most exquisite craftsmanship, exquisite design and seamless splicing, a total of 2498 jade pieces and 1100 grams of gold silk. The jade clothes of the Chu Han royal mausoleum in Lion Mountain, Xuzhou, Jiangsu Province are adorned with 4248 jade pieces of various sizes and 1576 grams of gold silk. The production process of golden thread jade clothes is extremely cumbersome, the materials used are extremely precious, and the whole process consumes huge manpower and material resources. Although it has high value, it has also become the focus of grave robbers' attention, resulting in the theft and destruction of mausoleums. In the third year of the Yellow Dynasty (222 AD) in Cao Cao's Wei Kingdom, jade clothes were banned, which marked the end of more than 400 years of production and use of golden thread jade clothes. Although this is the case, the tradition of jade burial has not ended. Jade cicadas, jade pigs, and nine orifice plugs are still used in tombs. The jade cicadas are usually contained in the mouth, the jade pig is held in the hand, and the nine orifice plugs are respectively plugged in the eyes, nostrils, ears, mouth, genitals, and anus. This practice has been preserved as a burial ceremony since then and has been used by successive dynasties.

3. Precious jade

During the Spring and Autumn Period and the Warring States Period, the production and

use of jade reached a peak, and the types and patterns of jade became richer and more diverse, and the symbolic significance of jade's social status became more obvious. The most famous story of this period is the story of the He's Bi: According to legend, the He's Bi was first discovered in Jingshan by Bianhe of the State of Chu in the Spring and Autumn Period, but was judged by experts at that time as an ordinary stone, and Bianhe was severely punished for it. It was not until King Wen of Chu succeeded that the stone in Bianhe's arms was re-polished to find its true value, so it was named The He's Jade (The Jade of He Shi). After King Zhao of the neighboring country learned of it, he proposed to exchange the He's Bi with fifteen cities. King Zhao sent Lin Xiangru to the State of Qin, so there was the allusion of "returning to Zhao in perfect condition". This story has been passed down through the ages reflects the ancient people's admiration for integrity, wisdom and courage, and also reflects the complex relations and struggles between vassal states during the Warring States Period. It can be seen that jade was precious at that time.

Jade in the Tang and Song Dynasties paid more attention to artistry and decoration, the production technology of jade was more refined, and the decoration and shape of jade were more diverse. There were two main sources of jade in the Tang Dynasty, one was the jade transported by tribute, which is now produced in Hotan, Xinjiang; the other was the jade paid by various places, such as the Min jade paid by Xinxi (now Xixian County, Henan Province) in Caizhou at that time, the Lantian jade in Shaanxi, the Xiuyan jade in Liaoning Province, and the Dushan jade in Nanyang, Henan Province. Hetian jade is warm and has almost no impurities, so it is revered as a noble jade, but it is not easy to come by. During the Tang Dynasty, the ritual jade used by the royal family also once used Min jade as its replacement. In many ancient books of the Tang Dynasty, there are descriptions of jade products, such as jade boxes, jade boxes, jade flutes, jade Xiao, etc., and many horse harnesses are also decorated with jade. However, in addition to the above varieties, the jade described in these books may not actually refer to real jade, but also include other high-quality stones. In the "History of the Tang Dynasty", it is recorded that the Taiqing Palace of the Emperor of the Tang Dynasty is set with jade carvings. According to research, it is actually from the white stone on Taibai Mountain, because the stone is delicate and flawless, just like beautiful jade.

According to the system of the Tang Dynasty, only officials above the third grade could wear jade belts, which shows that all kinds of jade are still the ornaments of the royal family and high-level nobles. There is a story recorded in "Youyang Miscellaneous" that Emperor Xuanzong of Tang blamed his subordinate country for not paying tribute to the jade, and the subordinate country replied that the jade was robbed by Xiao Bolu on the pilgrimage road. The emperor was so angry that he sent 40,000 troops, and finally "slaughtered the city, kidnapped 3,000 people and their pearls and returned". According to historical records, Emperor Xuanzong of Tang also used Lantian green jade to make jade for Yang Guifei (imperial concubine), which shows that a generation of emperors could not use Hetian jade at will. This situation was verified in the tombs of the Tang Dynasty, because the number of jade products unearthed in the tombs of the Tang Dynasty was small, and small accessories were the main ones.

In the Song Dynasty (960-1279), the royal family set up a workshop called "Jade Court", specializing in the production of jade, and from the country's ritual utensils to the decoration of daily cane heads to all kinds of jewelry, so it has a higher technical level, and the carving

patterns are more complex and exquisite. Since the problem of the shortage of jade resources at this time has not been completely solved, the craftsmen began to make up for it through technical means. Some jade materials that were slightly flawed in quality were used to carve exquisite jewelry. The craftsmen could use the change of jade color to carve the corresponding shape, thus forming colorful and exquisitely carved jade products. A phoenix-eared white jade cup in the Southern Song Dynasty (1127-1279) was carved from a piece of white jade. The jade cup had a straight mouth, a deep abdomen, and a small ring foot. The bottom of the ring foot was engraved with the word "Shi" (氏), and the cup wall was thicker. Both sides of the abdomen are decorated with an ear, which is phoenix-shaped. The phoenix mouth holds the edge of the cup, the wings are spread and attached to the wall of the cup, and the tail is connected with the cup body as a whole. The outer edge of the cup mouth and the ring foot are each decorated with a circle of back lines, and the cup body is decorated with four curved lines, which are embellished with patterns to form a pattern on the body, and these patterns start from the phoenix tail on both sides, and are treated as an extension of the phoenix tail on the cup body. The work is novel in shape and ingenious in decoration, which shows the high technical level of jade carving technology at this time.

The group of literati in the Song Dynasty emerged. This group of intellectuals with a high cultural level and the pursuit of various elegant things also became an important group for appreciating jade, and had an important impact on the development of jade decoration and style. Judging from some daily jade products unearthed at this time, the jade was relatively small, mainly small jade carvings in various animal shapes, and the carvings were also relatively simple, mostly line carvings and simple carvings, striving to maintain the integrity of raw materials to the greatest extent. A begonia-shaped jade pendant hidden in the Taipei Palace Museum is decorated with only a circle of lines engraved on the edge, which maximizes the warm and flawless texture of the jade plate.

The Yuan Dynasty (1271-1368) was the most extensive dynasty in Chinese history, which also solved the problem of obtaining jade materials from Xinjiang in one fell swoop, allowing a large number of high-quality stones to be mined and shipped to the mainland. In addition to Xinjiang, the production of jade in other regions also greatly increased. During this period, the shape and variety of jade products were relatively large, including both finely carved works and imitations of early antique works with a simple style dominated by line engraving. Among the jade products of the Yuan Dynasty, the Dushan Jade Sea, which exists in the Beihai of Beijing, is represented. Dushan Dayuhai is a jade urn carved from a whole piece of sapphire. It is said that Kublai Khan used to set wine to feast the ministers at the beginning of the Yuan Dynasty. The jade urn is the largest ancient court jade found in China so far. It is 0.62 meters high, the mouth edge and the base are slightly closed, the abdomen is convex, the maximum circumference is 4.93 meters, the abdominal wall thickness is about 0.12 meters, and the total weight is more than 1 ton. The color of jade sea is blue and white with black, the stone is soft and delicate, it is said that many craftsmen took five years to complete the carving, and the animal patterns carved on the inner and outer walls of the utensils include dragons, chi like sheep, carp, rhinoceros, snails, toads, mussels, swordfish, horses, rabbits, dolphins, rat head fish, etc., which are more than a dozen kinds of animals.

During the Ming Dynasty (1368-1644) and the Qing Dynasty (1636-1912), the supply of jade materials and the conditions for processing and carving were mature, and jade carving

and jade products were widely used in both the royal family and the folk. Therefore, various jade products became extremely rich, and their styles were unpredictable. Small jade jewelry pursues delicacy, and can also be combined with gold and silver to form gorgeous utensils, such as a gold two jade jue unearthed in Dingling (an emperor's mausoleum) of the Ming Dynasty, with the exquisitely carved jade jue as the main body, but the bottom adopts a dragon pattern gold tray base, and the base is inlaid with various colors of gemstones, which shows the superb level of carving and inlay technology at this time, and also makes white jade more noble under the background of gold and gemstones. It can be seen that jade still accounts for a certain proportion in the burial articles of the royal family and nobles. Due to the development of the economy, jade products have also begun to become popular among landlords and wealthy merchants, and have begun to be carved with auspicious ornaments, and combined with gold, silver and jade and other inlay techniques, but generally not as fine as the court jade, the style is relatively rough, and the carving technology is generally not high. In general, jade in the Ming Dynasty completed the development history from the royal family to the common people, and began to become a decorative material that the whole society pays attention to. In addition to daily accessories, there are also a large number of antique jade shapes. In terms of processing technology, it shows the development characteristics of pursuing simplicity and pursuing decoration. Jade is also more combined with various other materials to form a variety of distinctive jade products.

The Qing Dynasty not only continued to develop traditional jade materials from Xinjiang, but also opened a pathway for Burmese jadeite, which also allowed new styles to enter the Central Plains together with new jade materials. During the Qianlong period of the Qing Dynasty, a huge jade mountain with a height of 240 cm and a width of 96 cm was made. According to historical records, this jade was mined from Xinjiang, shipped to Beijing in three years, and then transferred to Yangzhou. It took countless skilled craftsmen six years to complete the carving. The Qing Dynasty court still admired the warm texture of white jade, and white jade still occupied the first place in high-grade jade. The processing of jade was influenced by the Inner Court Painting Academy, which paid attention to the shape, layout and auspicious significance of the pattern. At the same time, it paid attention to the carving process and paid more attention to the ornamental value of jade. In the folk, the ornamental and elegant style of jade is also very prosperous. In addition to accessories and jade utensils, more jade products are used for cultural play and display. At the same time, jade pieces are also widely used in various inlay crafts.

4. The skill of cutting jade

As an important part of Chinese traditional culture, the development of jade not only reflects the changes of ancient Chinese society, but also shows the aesthetic taste and cultural spirit of the Chinese nation.

Jade is a naturally occurring mineral, usually a hard stone with a beautiful color, luster, and transparency that can be processed into ornaments, artworks, or other uses. In mineralogy, jade is mainly divided into two types: jadeite and nephrite.

Hard jade has a high hardness, usually between 6.5 and 7 Mohs. Jadeite is mainly composed of aluminum magnesium silicate and comes in a variety of colors, including green, white, red, yellow, etc. High-quality green jadeite, especially Burmese jadeite, is considered the most precious and was not talked about until the Qing Dynasty when it was highly

regarded by the royal family.

The hardness of nephrite is slightly lower than that of jadeite, generally around 6 in the Mohs hardness. Nephrite is mainly composed of calcium and magnesium silicate, and the color is usually white, yellow, green or black. Hetian jade produced in Xinjiang, China is a famous variety of nephrite. In "Shuowen Jiezi", the explanation of jade is "the beauty of stone", that is, the beautiful stone. Therefore, the definition of jade in ancient China is very broad, including not only real jade (amphibole) but also serpentine, turquoise, malachite, agate, crystal, amber, ruby and other colored stone jade. Therefore, when appreciating ancient jade, we cannot only use modern scientific knowledge to distinguish the pros and cons, but also must have a historical perspective.

China is a major producer of jade in the world. Not only does it have a long history of mining, but it is also widely distributed and rich in resources. According to the Book of Mountains and Seas, there are more than 200 locations where jade is produced in China. After thousands of years of mining and utilization, some jade mines have been exhausted, but some famous jade mines are still being mined in large quantities, providing an endless supply of raw materials for the development of Chinese jade carving art. The most famous jade producing place in China is Hotan, Xinjiang. Hotan has the richest amount of jade, the brightest color, the best quality and the most expensive price. It is an important source of jade raw materials in ancient China. The royal families of all dynasties loved to use Hetian jade to process into ornaments or utensils. In addition to Hetian jade, Jiuquan jade in Gansu, Lantian jade in Shaanxi, Dushan jade and Mixian jade in Henan, Xiuyan jade in Liaoning, etc., are also commonly used raw materials for Chinese jade.



Figure 4: Warring States, Jade Double Rhino Huang

China is one of the earliest countries in the world to mine and use jade. Hetian jade, Dushan jade, Xiuyan jade and turquoise are known as the four most famous jade in China. Jade not only has aesthetic value, but also occupies an important position in Chinese culture because of its warm luster and texture. It is often used to make ornaments, artworks and ceremonial items. There are many ways for the ancients to obtain jade. The earliest was natural gathering. People directly searched for and collected jade in natural environments

such as rivers and mountainous areas. This method is simple and direct, but the quantity and quality of the jade obtained is difficult to guarantee. With the development of technology, the ancients began to mine jade mines in an organized manner. China is one of the earliest countries in the world to mine and use jade. The famous Hetian jade, Xiuyan jade, Lantian jade, etc. have a long history of mining. Ancient jade was also circulated through trade and exchange. Ancient trade routes such as the Silk Road not only circulated silk, but also precious items including jade.

There is a famous Chinese saying that "the stone of other mountains can attack jade", which shows the true meaning of jade carving. In fact, ingenious jade is not carved, but the use of diamond sand, quartz, garnet and other "jade sand" with higher hardness than jade, supplemented by water to grind jade, and cut into the designed finished product. Therefore, in jargon, jade making is not called carving jade, but processing jade, or grinding jade. The craftsman's skill in carving jade is superb, but the tools for processing jade are simple. Although they did not have modern power tools and precision machinery, they created many exquisite jade with a deep understanding of natural materials and some basic manual techniques.



Figure 5: Jade processing process, use emery to polish jade carving

People use twine or animal tendons. After the rope is wet with water, it is dipped in high-hardness sand (such as quartz sand) and pulled back and forth. The sand is equivalent to serrated teeth to cut the jade. This technique is called sand rope cutting or wire cutting. They use materials with higher hardness (such as black quartz) to make drills, which are installed on wooden handles, and drill holes in the jade through the rotation of human or primitive machinery. This technique includes solid drilling and hollow drilling (pipe drilling) in two ways. People also use a mound machine (a rotating stone grinding tool), which cooperates with jade sand and water to grind the jade to make its surface smooth. By hand pushing and pulling, fine sand is used to engrave fine patterns on the jade surface. Finally, primitive people would also use leather or other soft materials to polish jade to make its surface smoother and shinier.

If craftsman need to make a hollow structure in jade, men need to cut a hole. It is very difficult to cut a hole. For jade that needs to be made into a hollow, the process of hollowing the jade is very challenging for primitive people without modern tools. They used some basic manual techniques and patience to hollow the jade. They used hollow tubular tools (such as bamboo pipes or animal bones), filled the tube with high hardness jade sand and water, and then repeatedly rotated the pipe drill to gradually grind through the jade and form holes. This method can be used to form channels inside the jade. Solid drilling techniques can also be used, which is similar to pipe drilling, but uses a solid drill bit. By continuously adding jade sand and water around the drill bit, the jade is gradually drilled through.



Figure 6:Liangzhu culture (about 3300 BC)

After drilling several small holes in the jade, use a slender carving tool, cooperate with the jade sand and water, and gradually dig out the material inside the jade from these small

holes. Then use bamboo or other flaky hard objects, cooperate with the jade sand, pull back and forth along a predetermined contour line, gradually cut out the desired shape, and hollow out the interior. Sanding and dressing, during the hollowing process, primitive people will constantly use grinding stones or other abrasives to polish the inner wall of the jade to make it smooth and trim the shape. During the whole hollowing process, water and hard jade sand are essential, they can help reduce friction and improve processing efficiency.



Figure 7: In the middle Qing Dynasty, topaz animal face pattern ring ear bottle

These techniques, though primitive, represented a fairly high level of craftsmanship at the time. Through these methods, people were able to make jade of various shapes, such as jade bars, jade congs, etc., which were of great cultural and religious significance in ancient societies. At the same time, it also took a lot of labor and time. It is speculated that during the Western Han Dynasty (202 BC to 8 AD), a medium-sized jade coat was made at a cost equivalent to the sum of the assets of 100 medium-sized households at that time.

5. Ivory carving

In addition to jade carving, there are many kinds of carving techniques in ancient China, among which ivory carving is also one of the traditional arts with the same long history as jade carving. Ivory is regarded as a precious material like jade because of its solid and fine texture and soft color. However, unlike jade, ivory materials are more precious, and affected by the material characteristics, ivory is not like jade, which can be widely used to make various handicrafts.

The techniques of ancient ivory carving are very rich. The first step is to design and chisel out the basic shape, which requires the overall shape and expression to be well shaped to lay the foundation for the vividness of the work. The second step is mainly to improve the brightness of the product, by removing the excess parts to make the surface of the work smoother. The third step is grinding. The traditional processing method is to polish with light leaves and grass to make the ivory products more soft.

Round sculpture is a three-dimensional image representation of ivory materials, carving and shaping various angles of the object to make three-dimensional handicrafts. Relief is to carve a raised pattern or image on the surface of ivory. According to the height of the raised, it is divided into high relief and shallow relief.

Carving is to use carving techniques to create penetrating or semi-penetrating holes in ivory to form exquisite patterns. Carving is similar to carving, but pays more attention to the depth and details of carving, making the work more delicate and three-dimensional. Use sharp tools to carve delicate lines on the surface of ivory to form a pattern or picture.

Another ivory carving process is inlay, which inserts different materials such as colored stone, blue and white jade, jasper, red sapphire, agate, tortoiseshell, etc. into the ivory to increase the color and layering of the work. The carved ivory carving works can also be dyed to make the colors of the works richer and more vivid. There are also some special techniques for ivory carving, such as the "ghost ball" in Guangzhou ivory carving, which can carve multiple layers in an ivory ball, each layer can be rotated, and each layer is engraved with exquisite patterns. Each layer of this ivory ball has several large holes, through which the layers of balls inside can be fluctuated.



Figure 8:Hemudu Ivory Butterfly (about 5000 BC)

The history of Chinese ivory carving can be traced back 7,000 years to the Hemudu culture. Ivory carving is a technique for processing ivory into practical utensils or carving works of art. The Hemudu culture's ivory carving art is very developed, the most famous of which is the "Double Bird Chaoyang Pattern Ivory Carving" unearthed in 1977 and 1978 at the Hemudu site in Yao Yu County, Zhejiang Province. The ivory carving is 16.6 cm long, 5.9 cm wide and 1.2 cm thick. It is a very smooth and polished cultural relic.

The front of the tooth carving is carved with a set of patterns with negative lines. The center is a concentric circle, and the outer circle is engraved with light, which looks like the sun. On both sides are engraved double birds looking at each other with their heads held high, facing the sun, in a symmetrical shape. There are six small round holes drilled around, the upper four and lower two. The back is made rougher. The composition is symmetrical and harmonious, and the edge of the butterfly-shaped device sets off the finely carved and smooth plume patterns, giving people a feeling of joy and upward. Another tooth-carved bone dagger unearthed at the same time was 15.8 centimeters long, 3.4 centimeters wide, and 0.8 centimeters thick. The front side was slightly raised, and the shape of a bird was carved into the image of a bird's head using the tip of the dagger's grip end. The other end was a flat bird tail, with smooth lines and clever shapes. The handle had a through hole near the dagger's body, which was presumed to be a rope.

The bird-shaped patterns on these ivory carvings are also the original prototypes of traditional Chinese flower and bird paintings, reflecting the aesthetic concepts and highest artistic achievements of the Hemudu people. From these works of art, it can be seen that the original Hemudu people love birds and worship the sun. In later Dawenkou cultural sites, a certain number of ivory carvings have also been unearthed. Among these products, not only are the products inlaid with turquoise, but also the decorative techniques of through carving. The ivory comb is carved from ivory skin. The lower end of the rectangular comb body is slightly narrow, and it is evenly opened into 16 fine comb teeth. The upper end is slightly wider, and there are three through-carving round holes. The comb is about 16.7 cm in length, and the

middle is decorated with engraving lines. These short lines are arranged in groups of three, and they are arranged flat to form a pattern similar to "8" on the comb, all of which are hollow decorations. On the small ivory comb body, the dense hollow patterns engraved not only reflect the level of ivory craftsmanship at that time, but also provide valuable information for studying people's ideology at that time.

The bone carving craftsmanship of the Xia Dynasty (2070 BC to 1600 BC) and the Shang Dynasty (1600 BC to 1046 BC) was developed on the basis of the traditional bone carving craftsmanship of the primitive society. In various ruins of the Shang Dynasty, special bone product production workshops were found, and the number of bone products unearthed was also very impressive. Bone, as a kind of plastic and easy-to-process material, was often polished or sawn with gravel in the Shang Dynasty, and was used to make tools and weapons, such as bone knives, bone drills, etc., and was also used to make daily necessities, such as bone combs, bone wedges, and bone hairpins. For precious ivory, various bone products in the Shang Dynasty were also used to imitate bronze to make various bone tools. The ivory tiger cup unearthed from the tomb of Yinxu, Henan Province, is carved according to the natural curvature of ivory, and a tiger-shaped cup is also set next to the cup for easy access. This tiger cup is made of bas-relief according to the decorative pattern of bronze ware, and is decorated with cloud and thunder patterns by the processing method of line engraving and bas-relief.



Figure 9: Merchant, ivory tiger cup

From the Spring and Autumn Period and the Warring States Period (770 BC to 221 BC), ivory carving was no longer just a practical tool, but became a form of artistic expression, specially used by the upper class to "watch and play well". According to the "Zhou Li Annotations", the ivory carving process of the Zhou Dynasty has become one of the eight main handicrafts. As an important craft for making priestly utensils, ritual utensils and court treasures, ivory carving has been valued by the royal family and has been included in the "Eight Materials" (the processing of eight kinds of arts and crafts). "Beads are cut, elephants are cut, jade is cut, stone is ground, wood is carved, gold is strand, leather is peeled, and feathers are analyzed." Among them, "elephants are polished" refers to the grinding process of ivory.

In the Spring and Autumn Period, ivory carving works such as "Yin Carving Double Hook Cloud Pattern Ivory Pendant" have shown high artistic value and craftsmanship. These works are not only more technically refined, but also more diverse in artistic performance. During the Warring States Period, the appearance of ivory carving Ruyi and other handicrafts marked the further development of ivory carving art. These handicrafts were not only loved by people at that time, but also had a profound impact on the art of ivory carving in later generations.

From the Han Dynasty to the Tang Dynasty (202 BC - 907 AD), due to the rise of overseas trade, the sources of ivory began to diversify, including Africa and other places in addition to South East Asia and India. The art of ivory carving in the Han Dynasty has been quite mature, mainly using line carving and shallow relief techniques, with detailed and smooth lines and prominent patterns. At the same time, there are also works using deep relief and engraving techniques, with unique and vivid shapes. In the Han Dynasty (202 BC - 220 AD), ivory carving imitated jade carving in decoration, and common patterns were geometric patterns, circle dots, etc. The characteristic of circle dots is that there are small dots in the center of the circle, and these decorative techniques add to the artistic effect of ivory carving. The subject matter of ivory carving works is mostly taken from real life, and even if there are images of divine beasts, they tend to be secular, no longer have magical and mysterious patterns, and the expression is simple and clear. "Xijing Miscellaneous Records" records that Emperor Wu of Han once "gave Mrs. Li an ivory matting," which is a kind of bedding made of ivory silk, showing the superb skills of ivory carving at that time.

The art of tooth carving in the Tang Dynasty (618-907) was not only popular among the upper ruling class, but also loved by literati, officials and wealthy families. The art of tooth carving has been greatly developed in the Tang Dynasty, with innovative and changeable shapes and superb engraving techniques. On the basis of inheriting the skills of the previous generation, the tooth carving in the Tang Dynasty incorporated new creative elements and techniques, such as deep relief and engraving, to make the tooth carving works more three-dimensional and vivid.

The Song Dynasty ivory carving has a considerable scale. In the Royal Workshop set up by the imperial court - the Wensi Academy, there is a special department responsible for processing ivory "ivory" to make ivory carving, which shows the importance and specialization of ivory carving technology. In the Song Dynasty, ivory carving technology was approaching maturity, and the shape was innovative and changeable. Technically, there was a set of carved balls. This set of balls used a complete piece of ivory material to be

cleverly hollowed out into layers of spheres, showing the rapid progress of ivory carving technology. Due to the prosperity of the economy and the expansion of the civic class, ivory products began to enter the people and be enjoyed by ordinary people, no longer only for the rich. In the Song Dynasty, ivory carving pursued fine, neat and magical colors in its artistic style, which was in line with the aesthetic concepts of the Oriental people.

Most of the Ming Dynasty ivory carving works are in the late Ming Dynasty, and there are many kinds, including ivory wat, ivory carving figures, pen holders, lid boxes, furnace cover tops, listing, etc. Among them, ivory wat, ivory carving figures, pen holders and lid boxes are large ivory carving pieces, which are the representatives of Ming Dynasty ivory carving. Ming Dynasty ivory carving crafts include opening, cutting, round carving, carving, shallow relief, reduced ground engraving, negative engraving and polishing, etc., almost all ivory carving production skills.

When ancient ministers went to the dynasty, they had to ask the emperor for instructions and report their work. In order to prevent forgetting, they wrote down the things that needed to be asked for instructions and reported on the board in their hands in advance to remind themselves, which was equivalent to a memorandum they carried around. The ivory wat was a necessary etiquette and practical utensil for middle and senior bureaucrats in the Ming Dynasty to go to the dynasty. Its shape and use ran through the entire Ming Dynasty. The Ming Dynasty ivory carving figure works were mostly based on Taoist figures, such as Guanyin, Shouxing, Amitabha, Kuixing, Arhat, Eight Immortals, etc., showing the cultural atmosphere in which the Ming Dynasty emperors advocated Taoism. The ivory carving pen holder and lid box in the Ming Dynasty often used landscape figures, courtyard stories, etc. as the theme, using bas-relief, round carving and other techniques to show fine craftsmanship and vivid pictures. In the late Ming Dynasty, the ivory carving ball, also In particular, the ivory carvings made in Guangzhou are famous for their multi-layered rotatable ivory balls.

The existing Taipei Palace Museum of the Ming Dynasty Eight Immortals ivory carvings, a group of eight independent figures into a group, the performance of the legend of the eight immortals story. This group of figures statues is 52-57 cm high, in order to maximize the use of ivory, the proportion of the characters is elongated, and conform to the ivory itself and curvature carving, the characters are vivid, but the overall carving decoration is relatively simple, mainly to highlight the streamline beauty, and no complex decoration is set, so it also shows the ivory material itself warm texture.

The Qing Dynasty ivory carving formed several ivory carving production centers and different styles such as Beijing style, Jiangsu style and Guangzhou style, and the art reached a peak in Chinese history. Beijing ivory carving is famous for figure carving, Guangzhou ivory carving is famous for fine ivory balls and mats on ivory beds, and Suzhou ivory carving is appreciated for its characteristics of landscape painting themes and meticulous painting styles. The Qing Dynasty ivory carving was fine in craftsmanship, using round carving, relief carving, and engraving and other techniques, and the works were well-defined and three-dimensional. The ivory carving has a wide range of themes, including figures, animals, flowers, landscapes, etc., often with historical, religious, and literary stories as the content, which is rich in profound cultural connotations.

"Yue Man Qing Tour Book" is a fine piece of ivory carving in the Qing Dynasty. It is modeled on the paintings of court painter Chen Mei and has been carefully produced by

dentists Chen Zuzhang, Gu Pengnian, Liu Changcun, Xiao Hanzhen, Chen Guanquan and others. This work is a representative work of Qing Dynasty ivory carving art and is now collected in the Palace Museum in Beijing. This book is divided into twelve pages with the theme of the entertainment activities of the ladies in the palace from the first month to December. The titles are: "Looking for Plum in the Cold Night", "Playing Games in the Leisure Pavilion", "Swinging Thousand in the Qu Chi", "Shaohua Douli", "Watching Fish in the Pool", "Caipeng in the Lotus Pond", "Begging Qiqiao in Tong Yin", "Looking at the Moon in Qiongtai", "Watching Chrysanthemums in Late Autumn", "Bogu in the Furnace", "Embroidery in the Wen Pavilion", and "Looking for Poetry in the Snow". The pictures on the left pages are mainly carved with ivory, and are inlaid with various colored stones, blue and white jade, jasper, red sapphire and agate, tortoiseshell, etc. For example, the lanterns are embellished with agate and gemstones, while the The right page is paved with blue sand lacquer, and on it is inlaid with a seven-character poem on the imperial title of Qianlong Emperor, which is colorful. After the poem, it is printed with "Shufangrun" and "Qianlong Chenhan". This atlas of ivory carving was personally urged by the Qianlong Emperor. It gathered various craftsmen in one room, combined with ivory carving and inlay technology, and carefully carved masterpieces. The Qing Dynasty had developed ivory weaving skills. The ivory was split into silk and woven into mats, fans and other utensils, but because the production process was laborious and the people and money were damaged, Emperor Yongzheng once ordered that the production be prohibited.

6. Ancient gold and silverware

Gold and silver as two kinds of precious metals, both in the West and the East, are loved by people, in addition to its valuable properties, its unique luster and texture are also used as decoration, the most common is the production of jewelry all kinds of utensils. It is also because of the special properties of gold and silver as precious metals, so that the application of gold and silver products, regardless of ancient and modern China, is almost fixed in the high-end, precious and exquisite similar positioning and style, but also because of this, gold and silver are difficult to be like pottery, bronze and other materials as long as the utensils are preserved, they are usually with the needs of people's use and re-cast, so it is difficult to like other ancient cultural relics, through the comparison of historical artifacts to find the changes in culture and aesthetic taste between different periods and different regions.

The earliest gold products in China appeared in the Shang Dynasty and have a history of more than 3,000 years. The gold tools of this period were simple in shape and small in shape. Most of them were ornaments. They won by shape, and the patterns were rare. The gold mask unearthed in the three-star pile of Guanghan, Sichuan shows a quite high level of production technology. First, the gold content of this gold mask reached more than 85%, and the silver content was about 13%, which proved the advanced purification process of the gold torch at this time. Secondly, like other gold products unearthed during this period, this mask was first hammered into thinner gold foil and then made into various products. It can be seen that the good ductility of gold has been discovered by people at this time.

The simplest method of making goldware is casting, also known as mold casting, which is a kind of technology that melts gold or silver into juice and uses mold casting to make utensils. There are two technical prerequisites for using the Fan casting method. First, the melting

point of pure gold is high, more than 1000 degrees, and there needs to be continuous and strong heating conditions. Second, there needs to be a high-temperature-resistant container or crucible to hold the metal for heating. During the Shang and Zhou Dynasties, when the bronze casting industry was highly developed, this method was very skilled for craftsmen and the products were relatively fine. However, the process characteristics of the mold casting method are one-time molding, so the decoration is more simple, and the line shape wins, it is difficult to express complex details, and the material is thicker. The gold castings unearthed from Liujiahe Commercial Tomb in Beijing are the earliest known gold castings in China, confirming that China mastered the smelting and casting technology of gold utensils more than 3,000 years ago.

The social changes during the Spring and Autumn Period and the Warring States Period brought about an increase in the types of gold and silver utensils. The appearance of gold and silver utensils and the increase in silverware were very eye-catching. At this time, the gold and silver processing technology has also been greatly developed, and the processing level of gold and silver products is quite superb. The principle of the gold and silver process is to show and highlight the pattern under the contrast of two or three metals with different luster, so as to achieve the purpose of beautifying the utensils. The use of bronze ornaments began in the mid-Spring and Autumn Period and prevailed in the Warring States Period. After the Western Han Dynasty, it gradually declined. Its general practice is to pre-cast or chisel the grooves required for patterns and inscriptions on the surface of bronze utensils, then insert gold and silver wires and pieces, hammer them firmly, and then polish them with wax stones to smooth them to achieve the decorative effect of highlighting patterns and inscriptions. A gold-staggered bronze goose unearthed in the Spring and Autumn Period uses seal script characters in the form of gold-staggered bronze goose decoration, which is very gorgeous. This form of gold-staggered on the surface of the object, using the unique metallic color of gold and silver to contrast with the surface of the original utensils, can obtain a very prominent decorative effect, so it has been used for a long time in history. In the Western Han Dynasty, the combination of gold and silver has been used in more daily utensils decoration. The gold-staggered silver cloud-patterned rhinoceros in the Western Han Dynasty is very exquisite. Another bronze ox lamp in the Han Dynasty is decorated with silver-staggered techniques to form exquisite patterns on the ox.



Figure 10: Han Dynasty, wrong gold silver moire copper rhino zun

Another kind of gold processing technology is the production of golden thread jade clothes. The gold wire or silver wire used to connect the jade pieces is made by special technology. The gold is first beaten into gold pieces, and then cut into filaments. Finally, several strands of gold wire are screwed into a strand of combined gold thread, similar to the method of cotton thread spinning into yarn and then weaving into thread. The processing technology of gold wire has been developed in the Western Zhou Dynasty and the Han Dynasty. According to the finished product of golden thread, it is speculated that the heat treatment process of annealing may have been used in the processing process, so that the cross-sectional diameter of the gold wire is only 0.08-0.14 mm.

Due to the short history of the Qin Dynasty (221 BC to 207 BC), gold and silverware were extremely rare. The quantity, variety and production process of gold and silverware in the Han Dynasty exceeded that of the pre-Qin era. The use of gold expanded significantly during the Han Dynasty, because in addition to gold and silver ornaments, gilding technology became popular, which made the choice of materials that gold and silver could decorate more diverse. The gilding process has existed as early as the Warring States Period. The method is to synthesize gold and mercury (mercury) into gold mercury paint, then apply the mixture to the surface of the utensils, and finally evaporate the mercury by heating, so that the gold adheres to the surface of the utensils to form a decorative layer. At this time, gilt was carried out on the basis of the original bronzes and silverware, so that all kinds of golden daily utensils were obtained, which not only saved the amount of gold, but also obtained the ideal decorative effect.



Figure 11:Tang, gilt engraved auspicious beast silver box

The hammering process first appeared in Western Asia and the Middle East more than 2000 BC, and was widely used in the molding of gold and silverware. This is a process that uses the ductility of gold and silver to hammer gold and silver blocks, beat them into gold and silver pieces, and then make them into various shapes as required. The main tool of the hammering process is the punch, which is usually blunt and does not cut the edge. During processing, the punch is used to beat the front and back of the metal sheet to form a concave and convex effect, and there is basically no material loss during processing. In the Tang Dynasty, the arrival of merchants and craftsmen in West Asia, Central Asia and other places also brought a lot of technology including gold and silverware manufacturing, and the hammering process has been widely used in China.

In the manufacturing process of gold and silverware in the Tang Dynasty, the technology of hammering and chiseling has been developed to a mature application stage. Most of the gold and silverware unearthed in the Tang Dynasty are hammering and forming, which shows the great influence. The surface of the gold and silverware processed by the hammer can have the effect of relief, which enriches the expression of the gold and silverware. Moreover, the utensils produced by the hammer process consume less materials than the casting, and the process is relatively simple. Unlike the casting utensils, which require more manpower and material support, but can be completed by a single person. Therefore, in the production of gold and silver with softer and very precious texture, it is a simple, efficient and

material-saving practice, which is very popular in gold and silver processing everywhere.

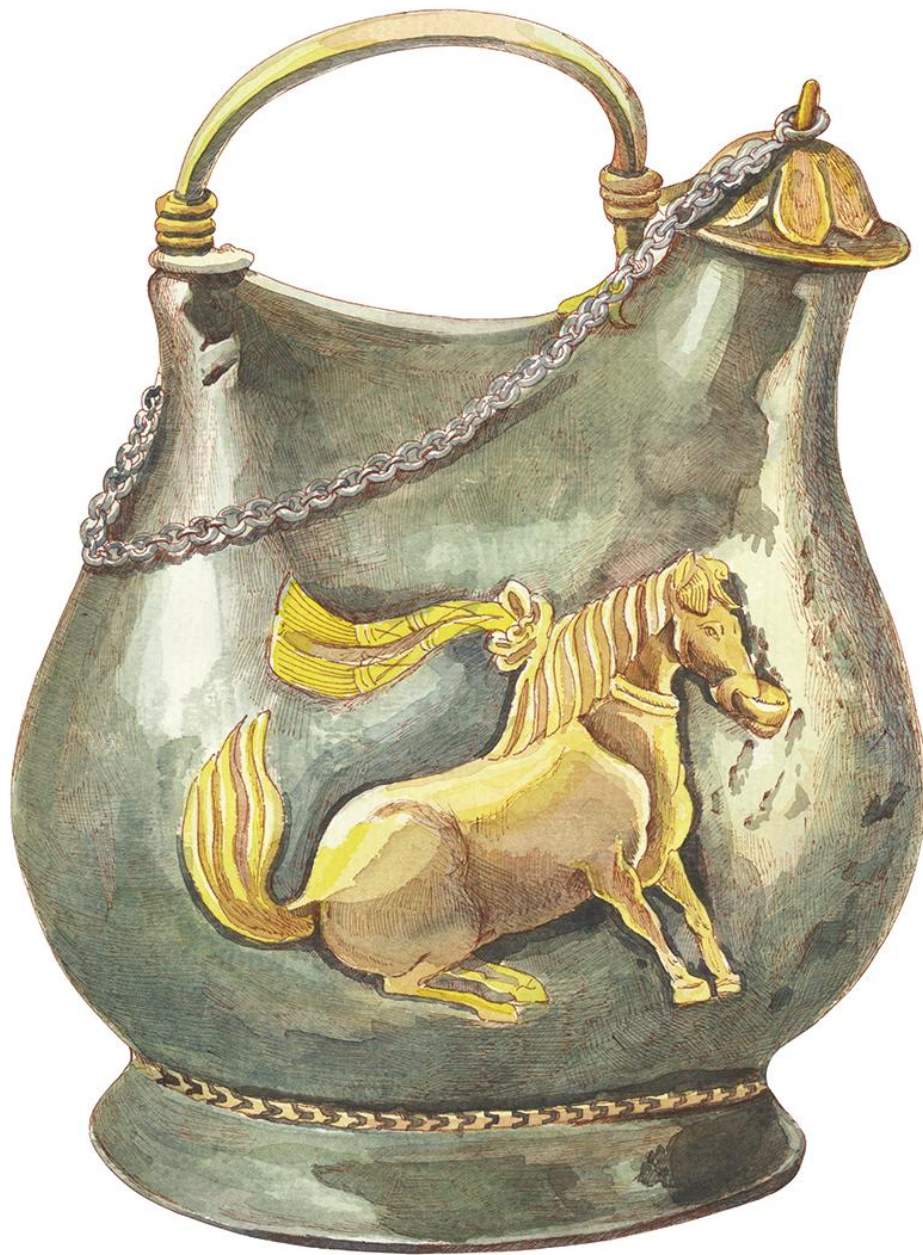


Figure 12:Tang, dancing horse cup gilt silver pot

The silver after the hammer can also be decorated by gilding to form a gorgeous image of gold and silver combined. In addition, the gold and silver after the hammer can also be fixed on furniture or other utensils as decoration, combined with other forms of carving, or inlaid with gemstones to form a gorgeous and prominent decoration.

Engraving is a further processing technique after the object is formed. Whether it is gold, silver or copper plate, the traditional operation is to put the broken material into a crucible, remove impurities during melting and cast it into a lump ingot, and then repeatedly overheat it and hammer it with a hammer to become a suitable sheet material. The thickness of the sheet used for engraving is determined according to the size of the work. The engraving can be

carved flat to make a pattern, or the gold and silver around the pattern can be "chiseled" off to form a relief effect. It is a fine metal processing technology, mainly used for engraving patterns and decorations on the surface of gold and silverware. A pair of carved flower silver boots was unearthed in a Liao Dynasty tomb found in Inner Mongolia, and the silver sheet thickness of the boots was only 0.5 mm.

Before chiseling, the craftsman needs to draw patterns on gold and silver products and gold and silver sheets. You can use a brush or pencil to draw patterns directly on the gold and silver utensils. Such patterns have a high degree of freedom and show different effects depending on the craftsman's drawing skills. If you need more rigorous, unified and accurate patterns in specifications and standards, you can use the paper pattern method to draw. The paper that draws the decorative pattern in advance is called the paper pattern. The pattern will be attached to the gold and silver utensils, and the decorative lines will be transferred to the utensils after being smoked by candles. When chiseling, the processed object must be fixed on the rubber plate before operation. The rubber plate is generally prepared by rosin, white powder and vegetable oil in a certain proportion and applied to the wooden board. When using, the glue will be roasted soft, and the metal plate to be chiseled will be attached to it. The chisel technology can be used to express patterns with strong contrast between light and dark, and enhance the artistic appeal. The core of the chisel process is the "chisel". The main tool used during operation is a variety of sets of chisels. These chisels are usually made by craftsmen. They are used to treat the pattern to make the surface flat, full and smooth, and the lines are clear. After the chisel is completed, the gold and silver utensils need to be degummed. The usual method is to wash the borax yellow mud with dilute sulfuric acid and water, and then stagger the joints and polish them smoothly. The chisel technology is an ancient technology for the processing of gold and silver utensils. A considerable number of gold and silver utensils in ancient times were treated with this technology, reflecting the superb skills of ancient craftsmen.



Figure 13:Gold and silverware processing



Figure 14:Tang Dynasty, Gilt and silver smoked balls

After the Tang Dynasty, with the maturity of gold and silver production and processing technology, gold and silver, as a precious decorative metal, are no longer limited to making decorations, but also began to be used in a wider range of utensils decoration, such as the most common is combined with jade, gold inlaid jade is considered a perfect match, usually combined by riveting method. The riveting method is to cut small holes in the two parts that need to be connected, and then pierce the nails (the material of the nails is generally the same as the material of the main body of the utensils), and the two ends of the nails are flattened and attached to the wall of the utensils to achieve the purpose of fixing. Riveting is a cold processing process that does not require heating the metal during processing, so it is suitable for those parts that are not suitable for heating or need to maintain the original properties of the metal. The riveted parts are not easy to separate, and have good durability and reliability. The riveting method is generally used to connect two parts of different materials, and the most representative is to repair jade bracelets. If a complete jade bracelet is damaged, it is usually chosen to use riveting and connect it with gold pieces. The gold pieces can be made in advance with exquisite patterns or inlaid with gemstones, which can not only reconnect the jade bracelets together, but also increase the decorative properties. The riveting method is to directly punch holes in the utensils for reinforcement and connection. This connection method

can provide strong structural stability, especially on parts that need to be opened and closed frequently or bear greater force, such as wood, ceramic, stone utensils. Where the buttons, hinges, handles, snaps, etc. are combined with the body, metal riveting can be used to enhance the strength of the utensils by using metal wear resistance and fastening characteristics. Rivets at the riveting part can also be designed into specific shapes as decorative elements to increase the aesthetics of gold and silver utensils.



Figure 15:Qing Dynasty, Gold inlaid gemstones Ruyi

Welding is commonly used in various metal processing techniques. It is to temporarily glue the two metal parts that need to be welded together with an adhesive, and then point "solder" at the adhesive (the solder can be made of gold and silver, or other metals such as copper and tin). Heat and melt the solder, and after cooling, the two parts are connected together. The earliest welding technology in ancient China can be traced back to the Xia Dynasty. In the late Xia Dynasty, bronze casting welding practices have been discovered in the Erlitou ruins. During the Spring and Autumn Period and the Warring States Period, the fine gold brazing technology of small areas and lines appeared, and the ancient welding technology began to embark on the road of fine development and was applied to a large number of jewelry. The welding technology of gold and silverware is a very important part of metal processing, which makes the production of gold and silverware more delicate and complex, especially in the production of exquisite gold and silver utensils and decorations. Although there are many metals that can be used for welding, only gold and silver have high stability, because the welding flux will adhere to the metal joint after heating and melting. If welding with copper-doped welding flux is used, green rust marks may appear in the weld after long-term corrosion. The welding flux of ancient gold and silver utensils used borax, dawn sand or rosin, and there are records of the use of halogen salts and salt tanks. Sometimes gold and silver were used directly to avoid corrosion and discoloration. Tang Dynasty a filigree group flower gold cup, the outside of the cup body by the gold thread first made the outline of the group flower, and then welded to the cup body, and then in the gold wire around the round flower center inlaid with gemstones decoration, although now inlaid in the

cup The gemstone has been lost, the filigree formed by the group flower contour is also firmly attached to the cup body, showing the advantages of welding compared with other connection processes.

In the processing technology of gold and silver products, there is also a more delicate and cumbersome processing method called weaving and overlapping. This is a very delicate metal processing technology, and it also uses the excellent ductility of gold and silver to process the gold and silver into extremely fine filaments, and then the gold and silver filaments are made into complex shapes by weaving, laying, and stacking techniques. According to the different weaving processes, it can be divided into two categories: plane weaving and three-dimensional weaving. Plane weaving is the use of gold and silver filaments as fine as hair strands, which are bent and welded to form various patterns. For three-dimensional weaving, first you need to use charcoal to shape various characters, birds, beasts, or utensils, and then use gold and silver filaments to coil on these carbon molds. The charcoal mold wrapped with gold and silver filaments is placed in the fire and fired. When the charcoal mold is burned out, the remaining three-dimensional gold and silver jewelry or gold and silver utensils are left. The "tired golden phoenix" mentioned in Chapter 73 of "Dream of Red Mansions" is a phoenix made of weaving process. Weaving gold and silver filaments requires extremely high precision and artistic sense. Because the gold and silver filaments are very thin, the operation needs to be very careful to ensure the accuracy and beauty of the pattern. Therefore, the weaving process has been used to make exquisite gold and silver jewelry in ancient times.

In ancient China, gold and silverware were used to make ceremonial musical instruments, living utensils, furnishings, jewelry and religious utensils. As a material similar to the popular currency in society, gold and silverware were widely used. In ancient China, gold and silver were used by the royal family and nobles, wealthy families, and religious groups for a long time in ancient times. In the Tang Dynasty, the use of gold and silverware was believed to help maintain immortality, so it was deeply loved by the upper classes of society. Against this background, craftsmen of all dynasties were keen to study new styles and new processing techniques, combining gold, silver with gemstones and beads in order to make more exquisite utensils. During the Ming and Qing Dynasties, superb processing skills produced extremely thin gold foil, which was used for decoration on buildings, and the development of gold and silver products reached its peak.

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