



# The Scientific and Environmentally Friendly Design Concept of Lamps in the Han Dynasty

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## Abstract

With the improvement of people's awareness of environmental protection, modern utensils design has gradually integrated the concept of environmental protection. But in fact, as early as the pre-Qin period, the ancients began to consciously integrate the concept of environmental protection and scientific design into the design and production of artifacts, and the most obvious embodiment of this concept in the artifacts is a series of representative environmental protection lamps unearthed in the Han tomb. The study of these lamps not only helps us understand the concept of life in the Han Dynasty, but also brings a lot of inspiration to modern design. The unearthed cultural relics are not only a revelation of the past, but also an action to see ourselves and the future. This article will describe in detail the historical research of these relics, and explore the "Environmental high-tech" of the Han Dynasty thousands of years ago, as well as the impact of modern environmental awareness and inspiration.

## Keywords

Han Dynasty design concepts, Environmentally friendly lamps, The wisdom of the ancients

## 1. Introduction

Today, with the deterioration of the environment, environmental protection has become a well-known concept, but what modern people did not expect is that thousands of years ago, the Ancients had an idea of environmental protection, and even in the Han Dynasty, this concept of environmental protection is integrated into and reflected in such practical and aesthetic appliances such as lamps and lanterns. Of course, this kind of precious equipment was mostly owned by the princes and nobles at that time. The air pollution power was weak in the general social environment, and the demand of the common people for clean air was not high, so the design of this environmental protection equipment of the Han Dynasty is more to protect the noble themselves an indoor cleanliness. Although the environmental protection referred to in the Han Dynasty is not the same as the environmental protection referred to today, understanding that our ancestors have already consciously and consciously realized the relationship between the environment and human life and production, and the fact that human beings not only have to adapt to the environment, but also have to transform and protect the environment is of great significance to our present environmental protection and the development of our environmental science. The environmental protection consciousness and ideas of the ancestors of the Han Dynasty are well reflected in the unearthed pottery and some bronze lamps of the Han Dynasty. At present, the representative of this concept has been unearthed cultural relics have demonstrated the Han people's awareness of environmental protection and design aesthetics, "The first light in China"—Changxin Palace lamp, the combination of practical functions and environmental protection concept of

Yanyu lamp, the Feather Pattern Copper Phoenix lamp made by subdivision casting method.

## 2. Brief introduction of representative utensil

### 2.1 Changxin Palace lantern

The Changxin Palace lantern, known as "The first lantern in China", was unearthed in 1968 at the Douwan Tomb of Mancheng (Ding Yao, 2013). Its well-preserved gilt bronze body and ingenious design shocked the archaeological community at that time. This lamp is in the shape of a hand-held lamp of a palace maid of the Han Dynasty. It is 48cm high. After a series of chemical reactions, the gold-plating technology made the Changxin Palace lamp golden and not easy to be damaged and corroded, which greatly increased the artistic value and durability of Changxin Palace lamp, this is one of the reasons why it can still be reborn in one piece after a thousand years. Here carefully look at the palace maid from the right hand, seemingly sparse and ordinary, but inside is a smoke pipe straight into the chamber body, from which the design can be seen exquisite; The Changxin Palace lamp is rare because it adopts the method of casting objects that has been used since the Shang and Zhou dynasties. Its entire body, whether it is the head, body or parts such as lampshade or lamp plate, are all removable, the rotating lampholder can effectively adjust the reflection of the light and the scope of the reflection, showing the Han Dynasty skilled craftsman's superb skills (Ku Yuwen, 1974).

### 2.2 Yanyu lamp

The Yanyu lamp, nearly half a metre high, was unearthed in 1985 at the Western Han Dynasty cemetery in Shuozhou, Shanxi province. Its whole body modelling fine unique, by the wild goose head back will fish-type lampshade in its mouth vivid image and named "Yanyu lamp". Like the Changxin Palace Lantern and the feather-lined bronze Phoenix Lantern to be mentioned, the whole body of the lantern is also made by the separate casting method. The head, neck, chamber body and lampshade are all removable (Tian Nan, 2015), and the lampshade has an arc-shaped baffle on the lampshade, can freely rotate adjust the light reflection range and play the role of wind shield, quite rare.



Figure 1. The picture on the left shows the design of Yanyu lamp.

### 2.3 The bronze Phoenix Lantern with feather pattern

The feather-patterned bronze Phoenix Lantern was unearthed in 1971 from a Han tomb in Hepu, Guangxi. Copper Phoenix Tong body chisel carved patterns, the pattern of feathers carved patterns. A hole in the back of the copper lamp is used to place the lamp plate, and the lampshade communicates with the head, neck and abdominal cavity, and the hollow abdominal cavity can hold water. The overall design is exquisite and lifelike. It is also a representative work of environmental protection lamps and bronze ware of Lingnan in the Western Han Dynasty. The overall design of the Phoenix is similar to that of the Yan-yu lantern, but it also has its own unique features: the head of the Phoenix is also in the shape of looking back to the prime minister, and the tail and feet of the Phoenix,

which fall to the ground as one of the supporting points, are in the shape of a tripod, quite shows the sense of stability (Liu Jingjing, 2019), but the difference is that its head and the bore body is not connected, but is located in the Copper Phoenix Mouth Lampshade and lamp disc separated from the space.



Figure 2. The Changxin Palace Lamp.



Figure 3. The feather-patterned bronze Phoenix Lantern.

### 3. Scientific concept of environmental protection

#### 3.1 Rationale

When the Changxin Palace lamp is lit, the ashes of the lamp will enter the body through the raised arm of the palace maid, and the chamber is designed to be hollow with water stored in it (Li Li, 2011). The ashes of the lamp will eventually settle into the water in the chamber, the utility model can effectively prevent the smoke ash from flowing into the room and threaten the indoor cleanliness, and the lamps made by the sub-casting method also have

the advantages of convenient cleaning and preventing the fouling. The bottom of the Changxin Palace lamp is also provided with a round hole, which is to solve the problem of poor indoor air flow and plays the role of regulating air pressure. It can be seen in this national treasure, it can be seen that the ancients of Han Dynasty not only passively reduced the pollution, but also actively adjusted the air pressure to make the indoor air more circulating. And the design concept of the Yanyu lamp also has many similarities with the Changxin Palace lamp. We know that the lamp oil used for lighting and burning in the Han Dynasty often used animal fats, when ignited, it produces a large amount of soot and carbon dust that doesn't burn well, which threatens the cleanliness of the room (Guo Linsen, 2019). The design of the goose body and neck makes the soot have no possibility to escape after igniting, it will follow the neck through the belly of the fish (lampshade) in the mouth of the goose into the central control abdominal cavity, and eventually settle in the water in the abdomen, which is more similar to the Changxin Palace lamp, while the feather-patterned bronze Phoenix Lantern is more concise, from the lampholder to the chamber, the Phoenix itself has a pretty integrated design aesthetic language. When the lampholder on the Phoenix's back is lit, the soot will enter the neck and sink into the abdomen through the air. The general way of decontamination is in line with the above two ways, I won't go into details here.



Figure 4. The internal analysis diagram of the environmental protection design concept of yanyu lamp.

### 3.2 The environmental protection idea and the appliance and the Han Dynasty appears the reason preliminary exploration

The state power of the Western Han Dynasty was at its peak, and the living standards and material needs of the general public and officials were greatly enhanced in comparison with the previous Dynasty, although these eco-friendly lamps represented by Changxin Palace lamps are a reflection of this prosperous era in the manufacture of instruments, it also brings some key issues: the requirement of the cleanliness of the use of lamps, or the ability to design, didn't appear until the Han Dynasty? Is because of this environmental protection copper lamp production technology to the Han Dynasty just appear? Or is the technology not so unattainable, but rather a changing perception that cleanliness is more important to indoor living? In fact, the emergence and prosperity of environment-friendly lamps in the Han Dynasty is composed of many reasons.

#### 3.2.1 The technical and conceptual aspects

The method of dividing and casting used in these lamps and bronzes were used in the Shang and Zhou dynasties, and the environmental protection ideas of the Ancients were recorded in the documents of the pre-qin period. But you should know that bronze ware production in the Shang and Zhou dynasties had indeed reached a relatively high level, but it was only in the Han Dynasty that bronze ware production was applied to the production of lamps and lanterns, which reached a stable and prosperous period, the gilding technique used to protect bronze lamps and lan-

terms also appeared in the Warring States period, but it was not until the Han Dynasty that it reached its peak (Yang Xin, 2020). All of these can explain the possibility of environmental protection lamps in the Han Dynasty in terms of making technology.

### **3.2.2 The grave environment and grave robbing were rampant in Han Dynasty**

For example, the feather-patterned bronze Phoenix Lantern unearthed in the Hepu region of Hepu, Guangxi, is close to the sea. It is warm and humid, with plenty of rainfall, and the soil around the tomb is mostly acidic. In such a burial environment, most of the bronze vessels are very easy to be corroded or mineralized, and are difficult to survive, but lamps such as Changxin Palace lanterns are protected by the gilding technology of the Han Dynasty, and because of their high value, they are better buried, so later generations can be found to the earliest batch of complete and contain the ancient concept of environmental protection of the representative lamps and lanterns in the Han Dynasty. However, despite the high technology, the complexity and high cost of making them, coupled with the prevalence of mass burials in the Han Dynasty, led to rampant tomb raiding and the loss of many valuable lamps and lanterns, this makes the environment-friendly lamps and lanterns of the Han Dynasty, which have been excavated and preserved completely, more precious.

### **3.2.3 The feudal hierarchy developed further in the Han Dynasty**

Finally, the hierarchy of feudal society was once again highly developed in the Han Dynasty. In fact, this can be seen from the lamp type of Changxin Palace lantern-palace maids, it not only reflects the difference in class and material conditions between the royal family and the aristocracy and the common people, but also contains the ideology of "People are precious" in ancient China, reflects the noble of the Han Dynasty for the ultimate pursuit of material enjoyment. Wild goose fish lamp contains people's yearning for a better life and Confucian ideas.

### **3.2.4 The unique ideology of the Han Dynasty and the concept of Confucianism brought about the combination of emotions and objects**

The official philosophy of the Western Han Dynasty was Confucianism, which was integrated into all aspects of people's lives under the background of the times of "Removing 100 schools and respecting Confucianism alone", among them, there are lamps and lanterns: The theory of human value in the traditional thought of creation is in line with the human-oriented thought of Confucianism, which can be seen from the Changxin Palace lamp, the height of the lamp body of Changxin Palace lamp was the same as the height of the more popular tables in the Western Han Dynasty. When people were writing at their desks, the optical fiber emitted by the lamp was equal to the line of sight of people, that is, to give the user the most comfortable experience, which reflects the Han Dynasty craftsmen people-oriented Confucianism, always pay attention to the user's own needs, emphasizing that things are for people to serve; In the Western Han Dynasty, both the fish and the wild goose were symbols of love and happy life, while the shape of the wild goose with a fish in its mouth with a bronze lantern symbolized the love between husband and wife and a happy life, from this we can see that these lamps appeared in the Han Dynasty because they are very much in line with the times for a better life of a yearning. It is also an interpretation of and an emphasis on Confucianism. Taminami pointed out that in the Han Dynasty, when discussing marriage, the wild goose was often used as a kind of betrothal gift. "On the one hand, it shows honesty and trustworthiness, on the other hand, it means to know one's seniority, to be well-behaved, to be orderly in one's age, and not to overstep (p. 112)."

## **4. To the past and present**

Today's design level and vision to look at these environment-friendly lamps and lanterns in the Han Dynasty is no doubt a dimension-reducing blow, but these environmental lamps for us today is not worthless or there is no response or reference. We know that when craftsmen in the Han Dynasty built these bronze lanterns, they always adhered to the Confucian thought of putting people first, always paying attention to the needs of the users themselves, emphasizing that objects were for people, this gives today's lighting designers a very important inspiration—from people's needs to develop better products. Secondly, although the environment-friendly lamps and lanterns of the Han Dynasty were designed more to maintain the need for cleanliness in the interior, in the modern design philosophy that now generally emphasizes "Green design", it requires lighting designers to shoulder more social responsibility and extend the narrow environmental protection ideas of a millennium ago to all aspects of daily design, this is the ancient wisdom of these lamps and lanterns can bring to today's most important significance. Finally, reflecting on the early days of modern design, "Form is more than function", "Form and function is difficult to balance" the situation has occurred. On the contrary, a series of lamps and lanterns of Han Dynasty, represented

by Changxin Palace lamp, have already contained the ability of blending aesthetics, practicality, humanism and so on. The contradiction between form and function has already been solved in the Han Dynasty (Li Qingqing, 2016). The “Alarm Bell” left by the ancients in the design of instruments should be kept in mind.

## 5. Conclusion

These environment-friendly lamps of Han Dynasty play an important role in the history of Chinese lamps and lanterns and the unearthed bronzes. After 1,000 years of wind and sand, whether it is the creation of technology or contained in the concept of environmental protection, in today's view is still as old as new. Similarly, the design concept contained in them is also a powerful support for posterity to understand some important concepts of life and yearn for a better life in the Han Dynasty. The green lamps of a thousand years ago may have looked clumsy in the technology of making objects today, but it contains the spirit of ancient craftsmanship is a constant reminder of modern designers to understand the heritage of ancient classical design is not in the form, but in its spirit. As Guo Linsen said, “The heritage of classical design is not simply nostalgia, but in order to create, create the future of Chinese design” (p. 115).

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