

Scientization Of Ceramic Art Image Establishment: From Technical Perspective

Guangda Han, Naizhang Zheng and Junming Wu*

¹Jingdezhen Ceramic University, Jingdezhen, Jiangxi, China

*woshiwxb@126.com

Abstract. The Ceramic Art is science to some extent, it has a scientific framework. The performance of ceramic art images should be based on scientific principles, using tools, and following methods. In the scientific framework of ceramic art, ceramic art is deeply integrated with science and technology. Ceramic art creation uses new technology and deeply breaks through technological conventions, and there will be a brand-new development.

Keywords: Ceramics, Art, Science, Technology, Craftsmanship

1. Introduction

When people appreciate modern ceramic art works, they often wonder: how is this made? Sometimes, even if you are familiar with ceramic craftsmanship, you can't get the first insight into the work surface, the craftsmanship traces and expressive techniques that are cleverly hidden behind the design inspiration.

Indeed, in the field of ceramic art, it does not seem to be able to answer questions such as "Can the language of art history touch the reality of art works?"[1] from an artistic point of view. The progress of modern technology has further promoted the prosperity of ceramic art. The continuous enrichment of ceramic art images and the continuous generation of topics can help itself establish a path to "scientific".

2. Scientific Structure of Ceramic Art

2.1 The Possibility Of Scientific Art

In Ernst Grosse's book "The Beginnings of Art", he explained whether "Art Science" conforms to "Science". He believes that art science can be science to a certain extent, and it has the conditions that science should have. Each science can be divided into two parts: "Description" and "Explanation". "To describe the department is to examine the actual situation of each characteristic and to show them; to explain the department is to summarize them into general rules."[2]

"Description" refers to the objective recording or reproduction after observation, that is, the process of artistic creation. "Explanation" is a theory formed by induction, deduction or logic, that is, the theoretical method of art. Therefore, both "Description" and "Interpretation" can correspond to "Observation" and "Theory".

In art science, does art creation come first, or art theory? According to the general law of art development, there should be art practice activities before art appreciation and art criticism. The thoughts of critics gradually evolved into artistic theories, which then reacted to guide the practice of artistic creation. Usually refers to "Observation" come before "Theory".

Popper believes that "Theory Precedes Observation." He distinguished science from technology. The so-called science means that theory precedes observation, and technology means that observation precedes theory. Popper established three worlds in "Objective Knowledge", namely, the material world, the spiritual world, and the spiritual product world. Art is man-made and is summarized as a derivative of spiritual objects.

In Karl Popper's "Three Worlds" theory, art is a product of the human spiritual world, a subjective or objective product created by humans based on subjective initiative. He believes that the derivatives of human activities, including art, are the products of human thought and practice in

terms of their origins. The third world itself will also generate new topics, enrich and construct its own structure, and this process is "Autonomous. They are by no means created by us. It is better to say that they were discovered by us, and in this sense, they exist undiscovered before they are discovered." [3] We can figure out the spiritual world of art that he wants to describe to us: the truth of art science eternally exists, and only needs to be discovered, not to be invented.

The image of ceramic art is objective, technical, and a product created by humans relying on tools and following methods. And technology itself is full of scientific rationality. Therefore, the essence of ceramic art is a real existence in the framework of art science, and it is not shifted by human will.

In order to prevent ceramic art from falling into the pure "Scientism" stereotype, from a technical perspective, we can only make assumptions that ceramic art is rational to a certain extent and is the final presentation under the scientific framework of ceramic art. The scientization of ceramic art requires that ceramic art should be guided by sufficient theories, analyze and sort a large number of subjective and objective conditions, follow scientific procedures, and carry out rigorous process design in accordance with the internal connections between the various elements of ceramic art creation. So as to make the correct ceramic art. It is true that the charm of ceramic art lies in the fact that "correctness" is often relative.

2.2 The Origin Of Ceramic Art

The origin of ceramic art is as long as the origin of ceramics. The production and evolution of ceramics are based on basic needs such as clothing and food, using tools and techniques, following methods, following logically set steps, and gradually incorporating subjective aesthetic consciousness, supplemented by functional, morphological and decorative designs. The emergence of the earliest pottery products means that humans have created a whole new kind of substance.

From the perspective of technological anthropology, ceramics depend on the application and needs of technology. The ancients discovered that the clay burned by the fire had a certain strength, combined with the needs of holding water and food, they made primitive pottery, and the rational thinking of tools was realized. The development of the form and decorative functions of ceramic products further shows that technology and art are based on the evolution and development of the unique functional attributes of human beings in the process of human development and evolution, such as the use of tools, the generation of consciousness, the need for aesthetics, and so on.

The study of artistic anthropology believes that ceramics are art, which originated from the need for decoration. Decoration is the basic activity of human beings, originally referring to the two meanings of dressing and dressing up. This innate nature has created the most important behavioral practice of human beings—visual production activities. As an important art form of visual production activities, ceramic art has gradually developed along with the historical process of mankind's understanding and transformation of nature.

2.3 Image Cleavage Of Ceramic Art

The image of ceramic art is visual. The ceramic art image is the objective reflection of the ceramic art appearance in the human mind, showing a specific shape and glaze decoration in a limited space. As a visual production activity, the essence of ceramic art is a behavior based on human aesthetic practice. Ceramic art needs the structural rationality that meets the inner needs of the work itself, as well as the formal beauty of the outer needs. In the end, the ceramic art image produces a pattern from the morphological appearance, that is, the passive impression produces a subjective design, so that the objective image is transformed into a subjective mirror image, which is finally reflected in the eyes of people.

The ceramic art image is spatial. Ceramic art is not a graphic art, but must be a combination of modeling processing and decorative design. The presentation of ceramic art is the process of finally concretizing on the space carrier by shaping the form and applying the glaze. Therefore, the complete carrier of ceramic art images is three-dimensional.

The ceramic art image is reappeared. Like traditional visual art, ceramic art has been full of artistic representation of image expression since its inception. Starting from the Neolithic colored pottery, the shapes and decorative patterns are full of scene expressions of various forms of human primitive life. Until contemporary times, art reappearing is still one of the most important original creative power and value destinations for the expression of ceramic art images.

The ceramic art image is static. The ceramic art works are transformed by giving shape, applying decoration, experiencing high temperature, and cooling down. In the end, the ceramic art image is solidified on a solid structure surface composed of glass phase, quartz, mullite and pores, sublimated, and presented in a static manner.

Although the final three-dimensional shape of the ceramic art image is static, its greatest charm lies in the changes in the firing stage. This possible change comes from the technical uncertainty of the ceramic process itself. In the raw material and firing stage, the changes of the composition, the difference of the atmosphere in the kiln and other factors will cause the transformation of the green body and the glaze. Inside the kiln, the body gradually shrinks and the glaze grows silently, but the final image is as mysterious as "Schrodinger's Cat".

3. Realistic Construction of Ceramic Art Images

3.1 The Structure Of Ceramic Art Images

As the most solid concrete carrier of "Beauty" manufactured on a human scale, the starting point of realistic construction of ceramic art works is beauty, and the ultimate goal is to meet people's physical and psychological needs. To a certain extent, the realization of ceramic art reality is rational, because the fundamental characteristics of technology and art are the same.

The combination of technology and art produces function and aesthetics, as well as rational and perceptual components. Therefore, the level of cognition and transformation of the material world is the basis for the ultimate display of ceramic art, and the concrete expression of images is manifested in a strong contemporary character. However, regardless of the current level of craftsmanship, the ceramic art image is ultimately composed of two parts: the shape and the glaze decoration.

Ceramic art modeling is the process of using the plasticity of the green mud to process it into the required shape, and the process of carving, engraving, engraving, scribing, and printing on the green body to change the three-dimensional shape. The modeling of ceramic art is the structural basis for the complete presentation of ceramic art images, and it must be built on the basis of craftsmanship.

Glaze decoration includes two aspects: glazing and color painting. Among them, color painting has gone through two stages -pattern decoration and painting reproduction. These decorations need to be attached to the carcass. Glazing is the use of glaze to cover the surface of the body. After firing, the glaze is combined with the green body to form a smooth and homogeneous vitreous layer. The color painting process can be implemented directly on the surface of the blank, or it can be decorated on the glaze surface. After high temperature treatment, the pigment is finally combined with the blank or glaze to solidify to present a decorative effect.

3.2 The Illusion Of Form

Ceramic art modeling is inseparable from the foundation of ceramic technology, and the influence of technology on modeling is everywhere. For example, the composition of the raw material determines the mechanism of the work; the moisture content of the mud determines the molding method; the shape of the body affects the stability of the body at the firing stage; the firing system is the final judgment on whether the ceramic art image can be fully presented, and many more.

In the practice of ceramic art creation, examples of modeling failure are often encountered. Limited to technology, the macroscopic form of ceramic art images is usually limited to the size of the furnace space. And the carcass must be hollow if it is larger than a certain size to prevent bursting during the firing stage. When the clay passes through the fingertips, what the

ceramic artist has in mind is not only the ingenious and original design form, but also the pre-judgment of the possible damage of the green body under the high-temperature molten state.

The illusion of ceramic art modeling is also that the progress of morphology is completely dependent on the progress of technology. The advancement of technology has brought advanced tools and improved the experience of the process, but it cannot change the underlying concept of ceramic art design. For example, drawing is a highly technical process that requires a lot of repetitive and mechanical exercises to achieve proficient operating skills. Facts have proved that the exquisite drawing shape eliminates the multi-dimensional possibility of styling design. This perfection can be replaced by mechanical action, and no further conscious design can be produced.

The conscious design of ceramic modeling will lead to the possibility of breaking away from ceramic pragmatism, and then produce purely concrete stereoscopic visual modeling that is not aimed at actual use of functional requirements. This leads to another topic, namely the relationship between ceramic art and sculpture. Although ceramic art and sculpture are not the same in terms of connotation and denotation, from a technical point of view, ceramic sculpture and sculptural ceramics are actually the same concept. Ceramic art often borrows the modeling language of sculpture. Sculpture "provides rich image resources for the development of modern ceramic art"[4], and the shaping of ceramic art often gives sculpture inspiration.

3.3 Technical Characteristics Of Glaze Decoration

Glaze color has the most direct and measurable relationship with technology. Glaze is a layer of substance attached to the surface of the carcass. It is called "Ceramic Glaze" on the ceramic surface and "Enamel Glaze" or "Enamel Glaze" on the metal surface. It is glass when it is not attached to the carcass. The appearance of glaze originated from the glass process, which improved the physical properties of pottery and made it waterproof and easy to clean. Therefore, it is widely used and gradually becomes a medium and carrier of decoration.

The concept of glaze is so important that in the history of ceramics, it was not called "Porcelain" until the appearance of silicate objects covered with glaze. In this way, ceramic art in a narrow sense must not lack the decorative effect of glaze. From the perspective of modern technology, the most primitive calcium glaze has many shortcomings: the color is monotonous, the appearance is not beautiful, the thickness of the glaze layer is uneven, the bonding of the glaze is poor, and it is easy to fall off. Even so, it was not until this layer of glass appeared on the surface of the carcass that the last piece of the puzzle in the modern concept of "Ceramic Art" was filled.

Early glazes did not have gorgeous colors. Low-temperature three-color glaze appeared in the Tang Dynasty, and high-temperature copper red glaze appeared in Jun kilns in the Song Dynasty. After that, the high-temperature color glaze gradually enriched. The gradual enrichment and change of glaze color does not mean that people's taste in the pursuit of color art is upgraded, but is determined by the current craftsmanship and knowledge base. In other words, with the gradual improvement of the scientific framework of ceramic art, practical guidance has been given to the current glaze craft, that is, the craft determines the glaze color.

In ceramic painting, decorative patterns were mainly used in the early stage. In traditional Chinese ceramic art, these patterns are strictly standardized and formalized, forming standard and repeated patterns, producing endless decorative effects. This kind of decoration is consistent with the symbolic culture in traditional Chinese art. Whether concrete or abstract decorative patterns, a cultural carrier corresponding to its realistic meaning can be found. The reappearance of ceramic paintings in the middle and late periods, such as the reproduction of figurative decorative patterns such as flowers, does not have a certain degree of influence on the form and organization.

Designing these complex patterns on the body is a technique. In the inspection of the more complex patterns, it can be found that "the designer must use the 'gradually complex' method step by step, and the graphics and the base must be modified in accordance with each other." [5] When the design is gradually born out of the process, technology and The separation of art is inevitable.

3.4 The Separation Of Ceramic Technology And Art Form

For a long time in history, ceramic technology and ceramic art are integrated, namely the potter's body. The potter not only undertakes the ceramic modeling and craftsmanship, but also is responsible for the final artistic form and decorative effect of the product. The painted pottery of the Neolithic Age was decorated with a large number of patterns. This decoration method is quick, simple and productive, and does not require much art and design skills. From a technical point of view, of course, there are reasons why the ancients lacked knowledge of glaze raw materials and their processing techniques, but there are also social motivations.

At a certain point in history, ceramic craftsmanship and decorative arts have a division of labor. The theory of social division of labor believes that society is pluralistic, and the division of labor will inevitably occur in large-scale collaborative production, and it is not a purely economic phenomenon. The refinement of the division of ceramic art creation means that there is a separation of form between technology and art.

At the end of Song Dynasty and beginning of Yuan Dynasty, ceramic painting suddenly mature. In the Cizhou kiln, an unprecedented form of decoration appeared. Its objects surface decoration of calligraphy vigorous and effective, humanistic painting vivid pattern exquisite. The images of white ground and black flowers are either complicated and rigorous, or abstract and sophisticated, which are incompatible with crude low-temperature tires and make-up soil. The reason is that the intellectuals participated in the production of ceramics, and although the intellectuals were negligent of craftsmanship, they were proficient in calligraphy and painting. During the Huizong period of the Song Dynasty, the concept of "Emphasizing Literature And Ignoring Business" prevailed. And also wars in the north continued. It was the choice of many intellectuals to keep their lives by degrade themselves to be a porcelain making craftsmen. In the process of conquering the south, the Mongolian rulers killed a lot. If the intellectuals wanted to protect themselves, they had to commit themselves to craftsmanship and write poems and paintings on the porcelain. The status of craftsmen is hereditary, all of offspring are not allowed to escape, and marriages are not free. They can only engage in craft production under supervision. In fact, they are slaves, but they are a mighty craft. The army of fine arts.[6] It was the turmoil of the war that caused a large number of intellectuals to participate in the production of ceramics, and the first peak of separation of skills and art appeared in ceramic technology and ceramic art.

The extensive participation of intellectuals in ceramic art production is both historical accident and inevitable. Ceramic craftsmanship is a collection of a complete set of knowledge systems. Ceramic technology and art complement each other and achieve each other. As intellectuals, the intellectuals recorded, sorted out and analyzed the experience and knowledge of the ceramic process, which played an immeasurable role in promoting the progress of ceramic technology and the establishment of a scientific system of ceramic art.

4. Echnical thought & application in modern ceramic art

4.1 Integration Of Technology And Art

People have deeply realized that "science and technology must be combined with art"[7], that art and science are both subordinate to the universal connotation of human practice and exploration activities, and that the development of cognition and knowledge systems gradually develops from simple to complex Basic philosophy.

Nowadays, the method of caring about the expression of ceramic art images is not only the duty of art critics, but also the academic mission of technical historians. The fusion discussion that is close to the scientific theme of ceramic art images also requires more technical perspectives to participate in it.

Craft and design influence each other and achieve each other. Modern ceramic art must be based on the gradual development of the fusion system of technology and art and become more

ingenious. In the production process of ceramic art works, scientific principles and technical means are the theoretical basis and practical support for the production of ceramic art works, as well as the starting point of ceramic art creation inspiration. Only by relying on science and technology can ceramic works of art inherit tradition, continuous innovation and in-depth development.

"Ceramic Art" is not only "Art of Ceramic", it also contains the scientific and technological connotation of "Ceramic Craft". The ceramic craft is a process that includes the entire process of ceramic production, including the preparation process of raw materials for ceramics, the molding process, the decoration and glazing, and the entire process of firing in the full kiln. It has a strong scientific and logical nature and also is the theoretical and practical basis for the artistry of pottery works to be reflected.

The modern ceramic art is limited by the basic realization conditions of ceramic technology, such as (1) the composition and source of raw materials; (2) the structure, size and temperature of the kiln; (3) the setting of the process flow cannot be separated from the image presentation Specific laws. However, the design expression of modeling and decoration has not completely relied on and was born out of classicism experience, showing a trend of returning to romanticism and symbolism. Although topics such as whether "Ceramic On-Glaze Painting" belongs to the category of "Ceramic Art" are still controversial, the basic characteristics of the combination of ceramic art and art cannot be shaken, and the trend of in-depth integration of ceramic art and technology will not change.

4.2 Use New Technology

Science is constantly developing, technology is constantly being innovated, and new manufacturing techniques and process measurement and control methods have begun to be widely used in ceramics. People have begun to re-examine the past methods of ceramic art image expression. Cognition has historical limitations, and scientific progress and technological innovation are powerful means to further update and improve cognition. These new understandings give us important enlightenment: technological traditions need to be broken, and the boundaries of art forms need to be broken.

Nowadays, more and more new technologies are applied to ceramic art creation. For example, the application of mechanical devices and computers in the design and arrangement of decorative patterns, the organization of decorative patterns designed by such techniques is controllable, and the degree of disorder is random and dynamic. For another example, the application of new molding methods such as 3D printing in ceramic modeling has enabled many shapes and structures that cannot be achieved by hand or traditional machinery to be presented. Ceramic art images gradually present an unexpected but rational state of prosperity.

4.3 Break Process Routines

In history, the most exquisite ceramic art images are presented by qualified products that are reasonable in shape, beautifully decorated, and made according to rigorous craftsmanship. Ceramic art works based on conventional techniques, whether functional or artistic, generally meet the expectations of the public's needs.

When design is born and out of technology, the possibility of image expression is magnified. For example, in glaze decoration, in recent decades, modern ceramic art decoration methods such as salt firing, soda firing, and Raku have emerged. This type of craft breaks the relatively closed and stable traditional kiln environment. Either the introduction of alkali metals, the flow of fire, or the forced migration of the firing space, the traditional law of quiet growth of the original glazed surface is broken, one is broken and one is standing, forming a new processing technology and decorative technique.

These new firing techniques present a simple, disorderly and rugged decoration style. This kind of glaze surface image seems to be deliberate or unconscious manipulation, expressing the real brushstrokes of fire dancing on the surface of the carcass. Perhaps it is this kind of technical concept

that abandons the rigorous craftsmanship, magnifies the uncertainty of the firing stage, and fully exposes the defects, which is the true charm of modern ceramic art.

5. Conclusion

Under normal circumstances, the creative process of ceramic art is not arbitrary. A design thinking is often imprisoned under the constraints of the process. All designs and expressions need to meet the requirements of craftsmanship, which is not only the characteristic of ceramic art, but also the unique charm of ceramic art. Nowadays, the development of science and technology has added means of artistic expression, and the opportunities of the times have also broadened the boundaries of artistic creation. Ceramic art is constantly approaching the freedom of scientific rationality from technical traditions. In the scientific framework of ceramic art, the creation of ceramic art deeply breaks through the craftsmanship, will have a brand-new development, and will eventually gain true creative freedom and realize true artistic value.

Acknowledgments

This research was supported by the National Project of Innovation & Entrepreneurship for College Students of Jingdezhen Ceramic University (Nos. 202110408031), and the Jiangxi Ceramic Heritage Protection & Royal Kiln Research Collaborative Innovation Center Project.

References

- [1] Yang Zhenyu. Language anxiety: From Art History To Visual Culture Research. *Architecture and Culture*, 2011(01):10-11.
- [2] Ernst Grosse, translated by Cai Muhui. *The origin of art*. Beijing: The Commercial Press, 1987:2.
- [3] Carl Popper, translated by Shu Weiguang et al. *Objective knowledge: a study of evolution*. Shanghai: Shanghai Translation Publishing House, 1987:171.
- [4] Hang Jian. The inexplicable Chinese "Modern Ceramic Art": The reality and problems of Chinese modern ceramic art since the 1990s. *Literature and Art Research*. 2003,(1):111-123.
- [5] EH Gombrich, translated by Yang Siliang et al. *Sense of Order: A Psychological Study of Decorative Art*. Hangzhou: Zhejiang Photography Publishing House, 1987:160.
- [6] Tian Zibing. *History of Chinese Arts and Crafts*. Beijing: Knowledge Publishing House, 1985:260-263.
- [7] Li Yanzu. Mega Trend: Integration of Art and Science. *Literature and Art Research*, 2001(01):98-112.