

Utilization of primitive fire systems to obtain effects of aesthetic and economical value

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Research Summary :

From ancient historical studies in Egypt in the prehistoric era, as well as in the Far East in the pre-Christmas period and in South Africa, Namibia, Mexico and others, it was found that the vessels found in these ages were burned in an open fire or in pit firing and not in fire furnaces in the sense we know Now, which consists chimney and a fire home separated from wares , the primitive open fire was the prelude to the emergence of ceramic fire furnaces now recognized, the systems of primitive fire resulting in forms of black effects due to carbon rising from the fire, By experience in ancient times the potters knew that carbon blocks pores And used the technique to produce vessels for storage of liquids and drinking water, and because the fire in prehistoric times was low (750-800) degrees Celsius the pots were high porosity, so they used the smoke to produce non-porous black vessels to store liquids and this appeared in the ancient Egyptian at some time Prior to the date, the pots with the black top pottery (and inside also black) were spread out and were produced for storage of liquids and for funerary use. These techniques disappeared in the following Egyptian civilizations due to the appearance of lime clays which was burned at a temperature higher than the Nile silt (850 – 1050 °c) .and so The fire furnaces with the fire home was separated from wares were appeared, and thus the vessels became porous due to the high porosity and red color due to the oxidation in furnace. Therefore, they were no need to the black-top pottery technique in which carbon was used to fill the pores. The method of carbonization is found in Egypt, Africa and Mexico and is still the same as the primitive method in Africa and Mexico. In the modern and contemporary era, the open fire or pit was spread to seek the aesthetic effect of smoke, not for use as it was in ancient times, in addition to these fire systems also have distinct aesthetic effects. They are also economical fire. Recently, in America and Japan, these systems fire spread to achieve aesthetic effects. The experimental study of researcher was an attempt to benefit from the historical study in the proposed fire and build on it to obtain effects of aesthetic value and color.

Key words:

Pit firing - Fuel - Pottery – Smoking- Reduction

Introduction:

In ancient times, in many countries of the world such as Egypt, the Far East, Africa and others, there were primitive and simple methods of fire that resulted in techniques with distinctive aesthetic effects such as black-top pottery in the prehistoric era in ancient Egypt, a technique with a distinctive aesthetic effect. Study of Primitive Fire Systems in some countries, the researcher attempted to use this study to obtain distinct aesthetic and color effects through simple and inexpensive fire techniques.

Research problem:

Get unique aesthetic and color effects through simple and inexpensive fire techniques.

Research goals:

1. Studying primitive fire systems for the purpose of benefiting from them in obtaining distinctive and inexpensive aesthetic effects.
2. Attempting to add to the primitive fire systems to obtain various effects and colors.

Research importance:

1. Revival of simple primitive fire methods with outstanding aesthetic effect.
2. Acquire aesthetic and color effects distinguished by simple and inexpensive fire methods inspired by primitive fire systems.

Study Approach:

Descriptive, analytical and experimental approach.

Theoretical study analysis:

(1) Through the study it was found that the open fire then and now is preserved from the air currents, we find that achieved in different fire systems as follows:

- The fire at the ancient Egyptian was inside a hole and around this hole a simple wall of stone and mud with a height of 30 cm and a diameter of 60 to 70 cm in order to keep the fire from the currents that move the fire and hot gases in its direction.
- The fire in southeast Russia was carried out in an oval hole in clay soil, which consisted of a place to burn fuel and a place to stack products adjacent, to keep the fire far from the air currents.
- The fire in South Africa is done in a hole of a depth of 50 to 100 cm in an area surrounded by trees and shrubs that work on protecting the fire from the wind, which works on blocking the wind from the fire.
- The fire in Mexico is done by placing burned pots around a circle and then put fuel as wood, branches and others, this circle compacts the pots to be burned in the open air, and compacted burned pots in a circle around the pots to be burned saves the fire from air currents.
- The fire in North America was done by making a wall or a small wall around the fire to keep the fire away from the air currents, and also this happened in some parts of India.

(2) The method of putting fuel, and stacking forms in the open fire controls the effects of black smoke on the vessels after the fire, we find that the ancient Egyptian put the fuel under the hole and after igniting it he put some cracks and stone tiles so that the pots are not directly connected with the fuel so we find all forms are red except for the contacts resulting from contact with the stack, it appears as a black spot from holding the smoke between them, but if the fuel is put above the pots the smoking will be random and blackness will appear on the pots according to the movement of the smoke and trapping it between the pots as in South Africa.

(3) Egyptian red pots of black top were adopted in this distinctive aesthetic effect on the method of fire and fuel contact or dried manure of animals and grinded directly with the parts to be blackened and then the fire so smoking and reduction at the same time reduction of the iron in the body and red lining of hematite and carbon confirmed the black colour.

(3) Most of the clay used in the past are earthenware clay with straw added to it to become porous and burn a low fire that does not exceed 850 degrees Celsius and burned utensils are all usable and not aesthetic. But now the smocked open fire is aesthetic not usable.

(4) Open fire was carried out with light fuel such as branches, straw, dry leaves, animal manure and the like to eventually burn in a temperature of 650 to 850 degrees Celsius because it is considered the simplest type of fire.

(5) Polishing with open fire gives beautiful shape and partially closes pores.

(6) Open fire and pit fire is the beginning of the development of fire systems and knowledge of furnaces with its different designs.

Results of practical experiments:

- The open fire is inexpensive all it needs is an open place to be made and simple colors and sawdust and produces distinct aesthetic effects at a simple cost as evidenced by previous experiences.

- The use of white or light body generally shows the black color resulting from the effect of smoke clearly and beautifully such as experience No. (1), (3), (4).

- The application of a layer of borax on the surface of the body before the open fire with high temperature makes the black color glossy and strong as polished such as experience (1), (4), (6).

- The use of salt with borax in the fire with increasing temperature in some places in the fire gives the effect of glass paint as a spot or a small point as in experiment No. (3).

- Covering parts of the form with aluminum foil prevents smoke effect from the covered part as in experiment (1), (6), and to control the effect of smoke on the forms aluminum paper can be used or dipping the body in the sand or clay for parts that are not preferred to be affected by the smoke.

- The use of some colorants such as ferric sulphate and copper sulphate gives beautiful color effects, but copper sulphate turquoise color is not fixed by a large proportion after the fire, while ferric sulphate has orange color and it is fixed after the fire as in experiment (3), (4), (5).

- Covering the building in which the fire was carried out with some venting such as taking out a brick and making its place empty for ventilation and inserting oxygen for burning better after the ignition of fuel and the exit of smoke and rising and landing of flames, so that the fire continues as long as possible before extinguishing.

- Fuel is ignited in a slow manner at the beginning so that all fuel does not ignite quickly so we do not take advantage of it, the slower ignition was better to take advantage of all the energy generated.

- Throwing table salt with fuel then fire can improve the color with the effect of borax and temperature.

Recommendations:

(1) Take into account the historical studies in the field of ceramic fire because it has great experiences that can be newly utilized significantly and inexpensive and has a distinct aesthetic effect.

(2) The study recommends a detailed study on the relationship between smoking process and sodium compounds (borax - table salt - sodium carbonate).

- (3) The study recommends the use of different colored materials such as (bismuth compounds - chromium - silver - nickel - titanium - copper - iron).
- (4) It is recommended to study the interest in the study of fire pit or open fire because of its aesthetic and valuable effects and it is easy in the fire and economic because it does not need glazes and expensive colors.
- (5) We must pay attention to the study of primitive fire in the ancient Egyptian, especially the method of compaction because of its significant impact on the results of the fire.
- (6) The study recommends the study of the outer line design of the shapes and their relationship to the process of smoking in terms of condensation of smoke on the surfaces according to their designs (circular or flat or other)

References:

1. African tribal pottery styles, September 2011, Ceramics and Pottery Arts and Resources, Article in Southern African Humanities, from <https://www.researchgate.net/publication/267336602>. (10 Jun 2019)
2. Baba Masahiro, **2009**, Pottery production at Hierakonpolis during the Naqada II period: Toward a reconstruction of the firing technique, **British Museum Studies in Ancient Egypt and Sudan from** http://www.britishmuseum.org/research/online_journals/bmsaes/issue . (15 Jun 2019)
3. Barrel, Pit, and Saggar Firing, 2001- 2011, A collection of articles from Ceramics Monthly, Published by The American Ceramic Society, from. www.CeramicArtsDaily.org
4. Ceramic Review, 2018, July – August, ceramics, Emerging Maker. (7Jul 2019)
5. Irina S. Zhushchikhovskaya and Yury G. Nikitin, 2015, Ceramic Firing Structures in Prehistoric and Ancient Societies of the Russian Far East , Asian Perspectives, Vol. 53, No, by the University of Hawai'i Press .(2Jul 2019)
6. Lucas A, Ancient Egyptian Materials & Industries, Edward Arnold (Publishers) LTD, London,1962 .
7. Nicholson, Paul, 2010, Kilns and Firing Structures, Journal UCLA Encyclopedia of Egyptology, 1(1) from <https://escholarship.org/uc/item/47x6w6m0>.
8. Robert Compton Pottery, 2019, Wood fire stone ware and porcelain, WordPress Theme by [Kadence Themes](https://www.kadencethemes.com). . (15Jul 2019)