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THE POSSIBILITY OF USING LIMESTONE ROCKS IN SCULPTURE AS
AN ALTERNATIVE TO MARBLE: AN EMPIRICAL STUDY

Amer Khalil Nasser¹

¹University of Babylon, College of Fine Arts

¹amerkhalil351@gmail.com

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ABSTRACT

The current research included the possibility of limestone rocks in sculpture as an alternative to marble (an applied study). The first chapter deals with the methodological framework for research. The second chapter included the theoretical framework that contained two studies. The first topic included two axes, the first of which was sedimentary rocks and the second concerned with the geology of the study area. The third chapter was devoted to research procedures. His research sample was determined, his methodology was determined, and the experiment was conducted on limestone stones, and the researcher came up with three sculptures as a summary of his current experience, after which the researcher proved his vision on every sculptural work. As for the fourth chapter, he paid attention to the results, conclusions and recommendations. And luster has an active role in achieving aesthetic and artistic values, as this characteristic has formed an attractive element for the recipient. That the researcher's orientation towards the stone material in the current experiment came in accordance with cognitive and technical data related to personal experience as well as knowledge and experimentation that greatly contributed to completing the current experiment. The researcher reached a number of conclusions, including that the sculptor's emphasis on achieving dazzling in the construction of the sculptural achievement through various techniques and formal formulations and manipulating the volumetric value is only a way to achieve the element of astonishment to highlight the aesthetic and expressive dimensions that the sculptural achievements carried in their folds. That the sculptor directed towards diversity with stylistic and technical treatments in the current experience, such as a malleable tool in overcoming formal stereotypes and breaking monotony and rigidity, thus achieving transformations in terms of form and content, which contributed to the creation of multiple subjects capable of interpretation based on his own vision in proposing aesthetic and intellectual concepts.

METHODOLOGICAL FRAMEWORK

1. 1 Research Problem

Stone material is one of the most widespread materials in nature, but the problem is in the process of selecting the types suitable for carving, since this material requires a great effort in determining the types that can be invested as a sculptural material, and this requires the participation of multiple sciences and knowledge to reach scientific results to determine the types. The appropriate and one of the sciences that are useful in such research is to rely on the science of rocks and minerals, which is mainly related to the science of the Earth in identifying and classifying these species. The current study is determined to choose types of rocks spread over a wide area in Iraq, specifically in the Zurbatiyah region, east of Wasit Governorate, which the researcher deems appropriate for research and exploration for the richness of this region with distinct types of stones which are of economic and technical value, and the scientific need to know these types prompted the researcher to choose a different group of them to define his question as follows: Is there a possibility of using limestone in sculpture to produce sculptural works as an alternative to marble?

1. 2 Research Importance

The importance of the current research also lies in finding Iraqi materials for sculpture that are compatible with the aspirations of the sculptors for renewal and the creation of contemporary form. The sculptors who aspire to produce stone sculptural experiments and to invest in the incoming types of stones benefit in the optimal selection process that is commensurate with their artistic experiences.

1. 3 Research Aim

The current research aims to discover the possibility of using limestone rocks in sculpture as an alternative to marble

1. 4 Research Limits

The current research is determined by the geographical strip adjacent to the Iranian border in eastern Iraq in the Zurbatiyah area of Wasit Governorate.

THEORETICAL FRAMEWORK

2. 1 Sedimentary Rocks

Sedimentary rocks are divided in general into clinker and chemical, according to the nature of the rock materials that they made.

2. 1. 1 Clastic Sedimentary Rocks

Clastic sediments consist of rock fragments resulting from the dissolution or disintegration of igneous, sedimentary, or metamorphic rocks, and the rocks formed from sediments resulting from these rocky fragments are called (clastic sedimentary rocks) and we can also refer to them as rocks Mechanical, since it is formed from sediments and then transported by mechanical means such as wind, water, and snow

2. 1. 2 Chemical Sedimentary Rocks

These rocks are formed as a result of direct precipitation from solutions containing dissolved salts. And that is due to the effect of the sea, where the degree of concentration of salts increases and begins to precipitate according to the degree of their melting. Precipitation may be the result of some chemical reactions between the components of these solutions, or between the solutions and pre-formed deposits (Al-Busaili, 1982: 247).

The sediments that are left behind from the substance dissolved in the water are known as chemical sediments, which are (chemical sedimentary rocks) and some chemical sediments are formed directly from the water in which they were dissolved in it, for example, rock salt is deposited from its solution when the evaporation of sea water, and such sediments are generally referred to In the name of inorganic chemical sediments, either chemical sediments that are formed by plants and animals or with their help are called (organic sediments) or (biochemical sediments). The last type is what the oysters extract from calcium carbonate from sea water and use it to build a calcareous shell, and when the oyster dies, it remains They shell on the sea floor and are involved in the formation of bottom sediments (Matthews, 1995: 104).

2. 2 The Geological Formation of the Zurbatia Region

The geology of the study area and the geological formations are exposed in the study area, which are from the oldest to the most recent:

2. 2. 1 Euphrates Formation

The Euphrates Formation, which is located near the Al-Fahimi Valley near Anah on the stable sidewalk, is distinguished by its thickness reaching 100 meters, and its average thickness is (60-70) meters. This formation is the early Miocene - the Euphrates formation is characterized by a shallow environment in which the marine environment overlaps with coral reefs and the lake (Kazar, 2020: 6)

2. 2. 2 Fatha Formation

The age of formation of the hatch, which is the middle Miocene, this section is located in the area of the hatch (15) km north of the city of Baiji, where the Tigris River crosses the Makhmur and Hamrin mountains and consists of layers of anhydrite, gypsum and limestone and the bottom part is identical to the formation of the Euphrates and the follicular, and the formation of the opening is represented by the Neritic limestone at the base Which has undergone evaporation processes of non-evaporated silt (Kazar, 2020: 7).

2. 2. 3 Injana Formation

It consists of sandy, silty and clay rocks, as well as limestone rocks. The lower bound of the contact with the formation of the opening is symmetric, and is inferred from the mixture of gravel, sand, and silt, and coherent with a binder material from the lead child, while the upper contact boundary, which is with the formation of the Muqdadiyah, starts from the first appearance of the gravel sandstone (Bellen et al., 1959). The development of sedimentary basins during the Mediterranean Miocene period in the Zurbatiyah region of eastern Iraq determined the gradual fall of sea level by dolomite and limestone, which

increases upward in the central part of the follicular formation (Kazar, 2020: 6).

2. 3 A Look at the Use of Stones for Sculpture in the Ancient and Modern World

Art seemed to be an indistinguishable element of human life, just as human life began to be non-contemplative and impractical to surround the world. Art in its early ages was not limited to being merely a means to perceive things or to increase their understanding with the purpose of controlling them or as a means to satisfy the sense of form.

Art at that time was mixed with magic, and with utilitarian tasks and most of its stone tools that were made by man in the Paleolithic era were a mixture of art and utilitarian function. It serves the two ends without distinguishing and separating the objectives, and the separation did not occur except afterwards, when you look at things in terms of their distinction, and after looking at the appearances of the world as being perceived and looking at one side of them separately (Attia, 2000: 27).

The statue of a girl from Warka is one of the most amazing Sumerian statues, which was executed from the material of waxed elastor stone, which was found on the temple of (Anana) in the city of Warka. The technical treatments in this model can be seen by inlining the eyes and eyebrows with colored and shiny stones, and a deep groove was dug in I smelled the head to install a wreath from another material. Perhaps this justifies the great Sumerians' awareness of the aesthetics of the statue regarding the variety of materials and their colors, as this is related to their love for life and the beliefs that they owe (Sahib, 2005: 82).

The theory of proportions in ancient Egyptian art has an artistic goal and not a symbolism related to living reality, as real perception confronted it. The human body depicted in ancient Egyptian art was supposed to be full of real life, and when its image indicates the possibility of becoming alive or similar to reality (Attayah, 2000: 40). The Greeks discovered (the golden ratio), which is the relationship of the whole to the part, i.e. the division of the thing or mass into two large parts into the whole, and this ratio was used which was called gold section. In architecture, it was also used in the arts of sculpture and painting. It is a lineage organized by the artist's mind to create shapes with aesthetic connotations and formal relationships in their belonging to the space they occupy (Ghazi, 2011: 9).

That what the early Italian sculptors Giberti and Danatlo brought of new technical treatments based in their folds on Greek sculpture opened the door wide for new geniuses who formed a renaissance in the field of sculpture, and Michelangelo is the most prominent sculptor during this era, and what distinguishes his art is the combination of the concept of sensitivity intense religious influences and manifestations of the method that are reflected in the substitution of the sense factor in its place harmony (Attia, 2002: 121).

The sculptor Michelangelo expressed the character of the Prophet Moses through his skill to liberate this figure from the stone, in which the figure

appears, with his strong impulse towards the Imam while being confined, and his movement confined at the same time, but expressing the position of the leader who hinted from afar the horizons of the promised land, he knew perfectly Knowing that his feet will never set foot, but this statue is transmitted to us. His image has unique values and feelings to the highest degree - meaning the eternal disparity (eternal dissonance) between ambition and inclination on one side and gain or realization on the other (Dewey, 1963: 395).

Rodin dealt with sculpture in a realistic manner, seeing that the figure was a hollow and protrusive, and he did not seek in his work to obtain smooth surfaces like what the classics used to do, but rather he relied on leaving traces of his fellow strikes on the stone to express the tension and excitement when the light is refracted on the surface. And due to that early period, the statue of the man with the broken nose, 1863, which affirms that the Rodin doctrine was seeking after personality and not aesthetics. (Abu Rustom, 203).

The sculptor Constantin Brancusi (1876 - 1957) says that what is real is not the outward form; the real is the loudness of things. Technically, Brâncui begins with human or animal shapes and then refines them in his quest for essence gradually. Rooster and birds in space, fish and others have all been reduced to pure stone or bronze shapes, usually polished containing the essence of this or that creature. Only the torso kicks the buttocks the head and shoulders, and the head alone follows the same process (Bowness, 1990: 211).

And the sculptor Jean Arp was able to confirm the physical connection, so our response to a sculptural work in part at this level of the unconscious in most of it, recognizing the shapes that we see with our own bodies, and this sculptor in his late stone works paved the way for abstraction as a technical means to ascertain the unconscious and the role of chance in art It derives from the Surrealist trend (Bowness, 1990: 284). Moore did not come up with any new revolutionary innovation, but it indicated a complete understanding of all the paths prepared for the sculptor in the mid-twentieth century, and whether that was due to the ancient or primitive faded art or to Rodin or Michael Englua or Jan Erb, or Gabo, there is no ambiguity about the character It is the center and Moore had the ability to make interesting sculptures from what angle he had the sense of three-dimensional form that only the greatest sculptors possessed (Bowness, 1990: 287).

RESEARCH PROCEDURES

3. 1 Collecting Data

The researcher collected data for the study area based on the geological data obtained from previous studies that determined the nature of the topographical area. The researcher benefited from the maps he adopted in his exploratory trips that ended on 10/1/2020 through which he determined his research sample after the surveys he carried out for sites Different areas are estimated at (1 km) to avoid the minefields scattered in the mountainous region, depending on the safe areas frequented by people, which are fertile areas rich in different types of sedimentary rocks.

3. 2 Selecting Sample

Three models were chosen as a sample subject to study and then it was intentionally chosen based on the observation and the researcher's experience by selecting the appropriate models of stones that he deems to achieve the goal of his research, after conducting initial field tests on them, such as testing the hardness, their ability to respond to the action of sculpting tools, and the shaping process to determine their suitability. In producing a contemporary sculptural experience. The research sample was intentionally determined

3. 3 Research Methodology

The researcher adopted the experimental approach being the approach used in applied studies, and relying on content analysis to reach the aesthetic and technical results that achieve the goal of his research.

3. 4 Hardness Test of Sample Forms

The researcher tested the hardness of the models by relying on the strength scale in a laboratory using the geological hammer, and it was found that the hardness of the sample models ranges between (50-12,5) (medium strong) and this hardness is suitable in the forming process and does not form a barrier that prevents the liberation of sculptural shapes from them by the known traditional methods.

3. 5 Experience

After ascertaining the validity of the limestone rocks in carving, the researcher proceeded to experiment and test stones are the sample of research and editing the sculptural forms, which is through which the researcher achieved the required compatibility with the goal of his research by extracting his models that were embodied in this stone material as an alternative to marble stones and it carries the researcher's personal vision for each of the sample samples, which are as follows:



Model 1

Dimensions: 12 x 10 x 8 cm

Material: Limestone

Completion year: 2020

The current figure represents a woman's head that was processed according to the researcher's self-vision, relying on his sentences of sensory data that frame most of the general form to form a contemporary visual discourse in which the sculptor relied on improvisational action through the real presence of the woman's figure and the sensual aspect represented by emotion at the same time through artistic formulation in which he exchanged symbolism with reality and form with value through the transformation of the sculptural achievement into an expressive image that is subject to a textual relational coherent and coherent within the constructive of the sculptural composition to express what is subjective and spiritual in the nature of the form. Where the visual image turns into a variety of techniques, the stone block is pronounced as a general body for the image of a woman and it is a conscious response and extrapolation of the shape to the relationship between the face itself and its final form, and between the focus on the unity and coherence of the artwork as



a visual discourse.

Model 2

Dimensions: 15 x 10 x 8 cm

Material: Limestone

Completion year: 2020

The harmonic occurring in the construction of this achievement in terms of form and content is like a tool in expressing the reality of man and his suffering through the formation of an atmosphere that indicates an emotional state in the construction of the sculptural work through the expressive action that the sculptor employed through the methods and techniques used in the implementation to transform the semantic given carried by the achievement. In its folds to a life phenomenon resulting from human perception, the sculptor tended to address topics related to the social aspect of the human being to show aesthetic and artistic values through the nature of the subject that represents an account of real suffering related to the human self. He carries it from rhythmic spaces that contribute to the annihilation of the human self and its integration with the surroundings as a visionary position for the person seeking the truth.



Model 3

Dimension: 24 x 11 x 10 cm

Material: Limestone

Completion year: 2020

The sculptor's dependence on the expressive method is nothing but a means of expressing a psychological state that constitutes a sensual stimulus to the recipient, so the presence of the realistic form and its absence at the same time is not a means to express a sensual spiritual meaning through which the sculptor has surpassed the natural icon of the human form alike. According to his stylistic data represented by manipulating the anatomical proportions, in an attempt by that the sculptor to transcend reality to arrive at a contemporary sculptural achievement that expresses aesthetic and artistic values. Which we can feel on the surface of this form as this aspect was important to the sculptor as long as it achieves the pleasure of revealing the meaning of our existence.

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

4.1 Findings

1. The physical properties of the stone material, especially the luster and luster, played an effective role in achieving the aesthetic and artistic values. This characteristic formed an attractive element for the recipient as it approaches the physical properties of marble.
2. That the researcher's orientation towards the stone material in the current experiment came in accordance with cognitive and technical data related to personal experience as well as knowledge and experimentation that greatly contributed to completing the current experiment.
3. Through the current experience, the researcher was able to open new horizons through the limestone material, because it has potential energy that can be invested by other sculptors in their various orientations and methods as an alternative to marble stone.

4. 2 Conclusions

1. The current experience confirmed the importance of stone material and its effectiveness in completing sculptural works with aesthetic and expressive values through the characteristics that this material possesses.
2. Limestone is one of the most widespread rocks in the study area, and it has technical specifications close to the specifications of marble, and based on these data, limestone rocks can be invested as raw materials in sculpture.

4. 3 Recommendations

1. The researcher recommends activating the sculpture branch curricula in the Faculties of Fine Arts, and that is the necessity of introducing the technical curriculum vocabulary that is concerned with the technical and skillful aspects of carving on stone, and making use of the results reached in his research on this.
2. Investment of stone material by technical institutions due to its economic and technical importance.

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