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RESEARCH ARTICLE

Recognizing the Golden Proportion of Zebu of Marlik Cemetery

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Abstract: A study of hidden and obvious angles of Iranian works of art, including the discovered artifacts of the ancient Marlik region, shows the rich heritage of this land. The ancient hill of Marlik, despite its tools and utensils, and especially its clay sculptures, is still explored due to its special elegance and beauty. The aim of this study is to have a measure of fit and linear range in Marlik pottery and to get acquainted with its hidden angles. In this regard, the question arises as to how the use of golden proportions and the visual element of the line (as a range) appear in dimensions and sizes of the clay figures. In this regard, 6 index statues have been excavated from Marlik Cemetery and the results showed that 3 clay statues follow the golden ratio of $\sqrt{2}$, $\sqrt{3}$, $\sqrt{4}$ and $\sqrt{5}$. And they have a good linear range and balance, exaggeration and harmony can be seen in them. In this process, the other 3 statues are not attractive in terms of size and dimensions and do not have the elegance of construction and design. In addition, the two factors of proportionality and linear expansion are in complete unity, and the role of positive and negative space to achieve balance is obvious. The research method here is descriptive-analytical and in the data analysis, the golden proportion approach has been used, as well as the collection of information is documented.

Keywords: Pottery; Zebu; Marlik Archaeological Site; Golden Proportion; Linear Scale; Aesthetics.

Introduction

Iranian culture and civilization along with other regions of Central Asia and the Far East have always been the focus of archaeologists and artists, and among these, one of the characteristics of Iranian civilization has been and is the ancient hills and the ancient region of Marlik in Gilan province. During the excavation, a variety of silver and gold vessels, bronze vessels, glass and pottery sculptures of animals and birds were displayed in front of the eyes. In this process, the body design of humpback cow is very important. In order to achieve the beauty and fitness of these figures and with the aim of having a proportion in the components and the whole in the linear range, this study led the authors to use the golden fit criterion and use the index square and rectangle $\sqrt{2}$, beauty, examine the authenticity and appropriateness of humpback cow. In this regard, the question arises as to how the use of the golden ratio and the visual element of the line (as a range) appear in dimensions and sizes of the clay figures? In this research, 6 significant statues from the mentioned cemetery have been

studied. Regarding the research hypothesis, it can be said that the ratio of $\sqrt{2}$ in golden ratio is clearly observed in most animal figures, but the visual element of the line with a balanced visual range is lacking in some organs, and this originates from the uneven arcs of volume design in some figures.

Research Method and Background

The leading research method is descriptive-analytical and the collection of information and images is based on library and documentary materials. In the analysis process, what is considered is the selection of privileged and rare sculptures along with the selection of design methods and the use of environmental lines in humpback cow. However, paying attention to the subtle details of the shape of figures and the delicacy in the balanced and calculated curvature, has contributed significantly to the quality and content of the research. Regarding the research background, it should be said that so far no research has been done on mountain animal sculptures with the golden ratio

approach in the ancient Marlik region and most of the articles or dissertations of researchers have been in the field of architecture and focusing on houses and historical buildings. Which is mentioned below. Ziaeinia and Hashemi Zarjabadi (2015) in their master's dissertation entitled "Study of geometry and golden proportions in the design and spatial organization of historical houses in Birjand" has studied 10 landmarks and have considered the golden ratio in all architectural spaces.

Mohammadzadeh et al. (2014) in an article entitled "Proportion, beauty and latent geometry in Aqkandeh type pottery" have examined the proportion and latent geometry in Aqkandeh type pottery. It turns out that some of these pottery correspond to the number 0/ 618 golden ratio and some are related to a number close to the golden ratio.

Hashemi Zarjabadi et al. (2015) in an article entitled "Reading the Analysis of Geometric Principles and Golden Proportion in Shokatiyeh School" studied the unique features of the architecture of the building, which indicates that the architect has used

geometric principles and a precise system of geometric proportions in its construction.

Karimnejad and Abdi (2013) in an article "Golden proportions in the historical architecture of Agha Bozorg Mosque in Kashan" while introducing the golden proportions in the historical buildings of the mosque, concluded that the golden ratio between the dimensions of different parts of the building is equal to the golden number.

Faramarzi and Alipour (2013) in their article "Study of geometry and golden proportions in traditional architecture" have pointed to an approach of balance and logical order in traditional architecture.

Bahramian et al. (2016) in the article "Recognition of Golden Proportions in KamaluddinBehzad's Paintings - Case Study: Samarkand Grand Mosque" have tried to recognize the place of proportions in Timurid painting and composition of Behzad's works.

Hashemi Zarjabadi and others in (2018) in the article "Golden Proportion and Geometric Analysis in the Historical Monuments of South Khorasan" have created the balance and form and location of the

architectural elements of this building in comparison with the golden ratio.

Marlik Area

Marlik is the name of an ancient hill located in the Goharood valley of Roodbar city between Rasht and Qazvin (Negahban, 1999: 17). There are different opinions about the name Marlik; some believe that the reason for this naming is the high presence of snakes in this area and refers to the legend of "treasure and snake" which is believed in local beliefs. Many underground treasures have a spell that is usually embodied in the form of a snake (Taslimi, 2002: 124). But some others associate this word with the ancient people of "Mardha" or "Amrdha", which is composed of two parts, "Mard" and "Lik" and has the meaning of Qomard. The group argues that the word was originally "Mardlik" and that over time it has become Marlik by removing the 'D' (Taslimi, 2002: 529). Research shows that the tribes living in the southern areas of the Caspian Sea were statisticians who attributed the Marlik civilization to them. They built their houses between caves and

mountain crevices. They hunted mostly animal to feed and less for livestock. Their clothes were short and they were always armed (Maqouliet *al.*, 2015: 52)

Marlik Excavation

Excavation of this area was done in 1940 with the cooperation of the Archaeological Institute of the University of Tehran and the General Department of Archeology of the country and under the supervision of Ezatollah Negaban (EslahArabani, 1995: 532). The discovery of exquisite works shows the existence of rich people and high social life in this region; and also the artistic and industrial quality of these works shows a high artistic and industrial school in ancient times. We have been dating it to millennia ago. According to Negaban, "Marlik's works represent the ideas, thoughts, and mirrors of aspirations and feelings of its people, and have added an eternal leaf to the pages of Iranian history" (Negaban, 1999: 180). The artifacts of this area have been obtained from the heart of tombs; Negaban in his preliminary report on excavations of this area

pointed out that the statues found in the tombs had a religious and decorative aspect. Some of them were buried in the grave during religious ceremonies and burial ceremonies, and others buried exquisite honors and objects with the dead because of their religious beliefs” (Negaban, 1964: 29). The area included silver and gold utensils, bronze utensils, glass and mosaic utensils, as well as animal pottery sculptures, leopards, rams, mountain cows, bears, dogs, horses and animals found during the excavation. It is noteworthy that the number of mountain cows discovered in this area was relatively higher than other animals and was probably a manifestation of power and source of use (Negaban, 1999: 319).

Specifications of Mountain Cows

A total of eighteen potteries has been discovered in excavations in the Marlik area. Almost all the sculptures of the mountaineering pottery are hollow, with a tube in the animal's mouth. Twelve of these statues are red and six of them are grayish-brown. Their surface is polished and heated.

Two of these animals have black spots that indicate natural spots on the animal's statue. The surface of two of these statues has been polished in addition to being scorched. These sculptures vary in size range in length from 29 to 25 centimeters, and vary in height from 19 to 25 centimeters.

Almost all of these cows have humps, which indicate the strength and power of the animal, which is very large and exaggerated. In general, the components of the face have not been considered and only long, crescent-shaped horns of the animal, which are oriented upwards and forwards and have sharp points, are located in front of the mountain. Most of these sets have ear holes and some of them have earrings. Golden ones can be seen. The sculptures generally depict large, fat animal's chest, with a prominent vertical bar in the middle in front of its statue, possibly the animal's chin. The animal's statue is generally made with a certain softness and mentality, and the statue shape is simple, the legs are short and conical. The animal's tail is also displayed as a prominent bar. The male penis is prominent under the animal's

abdomen. The pottery collection is completely stylish, which shows the desired perfection of the animal's innate nature and strength, which is power and strength (Negahban, 1964: 370)

Golden Proportion

One of the qualities that has always been discussed by historians and artists throughout history is the issue of beauty and elegance. This quality can be seen in the works of art of civilized and even primitive societies. The concept of beauty is quite relative. One of the important features that make a work of art beautiful to our eyes is "Proportion". No art can be achieved without proportion. There is a special proportion in architecture and painting, and in general all the material arts are proportional, and each system implies a number, so it can be rightly claimed that objects belong to look like beautiful intermediaries (Tatarkiewicz, 2002: 48) In the visual arts, proportions are a mathematical concept that expresses the relationship between components and between each component or the whole work.

"The principle of unity in a work of art requires that the various relations with each other show a fixed relation. (Pakbaz, 2011: 170) This proportion is shown by the number "phi" φ which is the twenty-first letter of the Greek alphabet."That is, 1/618 is mentioned as the most beautiful number in the world. "Phi number is a number sequence in which the sum of two adjacent numbers makes the next number and outside of them has the properties of Phi number 1/618." (Eco, 2011: 37)

Plato considered this number to be key to understanding existence (NoorAghaei, 2010: 32). "The basis of nature is based on proportions and special measures that have been included in a special order, the evolutionary flow of the world and the universe, guide its evolutionary path towards perfection."Opening up to the universe becomes acquainted with the measure that God the Blessed and Exalted has used in the pursuit of nature and in the very nature of man's creation" (Ayatollahi, 1997: 180). According to American mathematician Whitley Eves, throughout the history of

human life there have been two types of understanding of geometry, scientific geometry and unconscious geometry. Scientific geometry was the result of deriving rules from separate and individual geometric observations. The benefit of this regularization was the arrangement of geometric problems in sets that could all be solved in one way. These general solutions are called geometric rules; this is the excellent and advanced stage of scientific geometry (Eves, 2004: 1-4). Farabi, one of the Iranian philosophers and scientists, also believed that geometry is considered in the classification of mathematical sciences and it is known as the science of recognizing values and ratios (Farabi, 2005: 82). Unconscious geometry was formed by ancient humans and apparently had its roots in recognizing natural shapes and comparing shapes and sizes. In the meantime, it created simple geometric concepts and shapes, such as rectangles and squares. Subconscious geometry was used by humans to make decorative objects and patterns (Mohammadzadeh, 2014: 4).

In later periods, human beings tried to reach a harmony and order in geometric works of art from geometric rules. The golden proportion of the proportions that have always been used since ancient times. "Ideal geometry is the result of the transcendence of geometry in human mind and is magically fascinating. The human mind imposes an ideal geometry on the world, meaning that the ideal geometry expresses the human order and desire to achieve a perfect form that does not exist in nature. "It shows the ability of man to overcome limitations and imposes his desire on the world through the ideal geometry" (Mohammadzadeh, 2014: 1).

The Egyptians were the first to use proportionality and later passed it on to the Greeks and then to the Romans. Due to the lack of sufficient evidence, the scientific nature of these proportions cannot be proven. Renaissance writers called this proportion the celestial relation, and Euclid's followers called it the nature of the middle and the sides. And from the nineteenth century onwards, this fit became known among artists as the Golden Division

(Bozjani,1990: 123). Proportions can also be seen in some works of art in Iran. According to studies on some of the sculptures in the Marlik region, it is clear that in some of these works, golden proportions have appeared.

How to Calculate and Check Golden Ratio Using Index Square

The golden ratio of "the name of the mysterious proportions known at least at the time of Euclid" is the simple definition of the golden ratio: the unequal division of a line, so that the ratio of the smaller to the larger is equal to the ratio of the larger to the whole (Pakbaz, 2011: 572). This ratio is "a mathematical formula that has a lot of beauty and dignity" (Dondis, 2010: 88).

In the Renaissance, they used the golden ratio law. The golden ratio can be the ratio between two parts of a line or two dimensions of a flat image, with the ratio of the smaller segment to the larger one being the ratio of the larger segment to the sum of the two. Algebraically, it can be expressed as equality

between two ratios. $a/(a+b)=a/b$ (D.k. Ching, 2009: 304)

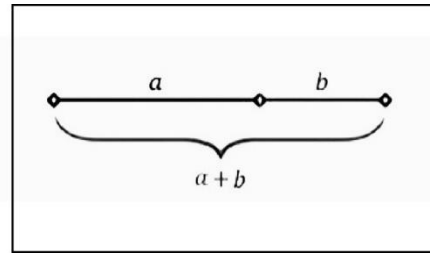


Fig. 1. How to divide a line segment into an unequal part

It is this unique point that divides the single line into segments with qualitative proportions. It is a reflection of multiplicity within unity in terms of geometry. If the line is divided into equal halves, the two segments would be a monotonous repetition of one and the same thing, neither multiplicity nor unity within the geometry (Dabbour, 2012: 382).

According to Figure (2), the expression of this method is that we place a part of the work inside a square called "index square"¹. (Which is in the square image and a b c d). Using the square diameter of the "AC" line segment, place the nipple at point "C" and draw an arc to cut the "CE" line segment.

¹The square that is used to obtain the golden ratio and plays an effective role in the construction of the

rectangle is therefore called the "index square" or "reproductive square" (Ayatollahy, 1998: 184).

From the point of collision, we draw a vertical line to this part and a line "E F" is created. The rectangle that is created if its smaller side (its main side, which is the index square side) is equal to one unit, and its larger side is equal to the square diameter, which is equal to $\sqrt{2}$. This rectangle has standard dimensions in works of art and is always used by artists. The approximate value is $\sqrt{2}$ times 1/4142. This rectangle has special features, for example, its diameter is $\sqrt{3}$ and the diameter of the rectangle is $\sqrt{3}$ times $\sqrt{4}$ and also the diameter of the rectangle is $\sqrt{4}$ times the rectangle $\sqrt{5}$ and so on. (Fig 3)

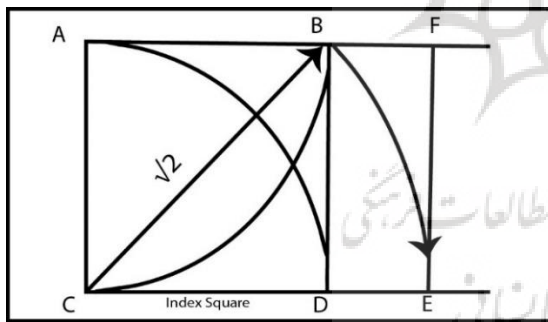


Fig. 2. How to get a rectangle $\sqrt{2}$

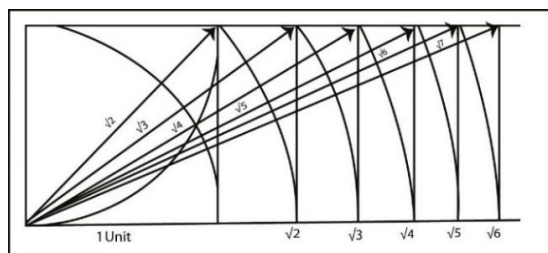


Fig. 3. How to get a rectangle $\sqrt{2}$ to $\sqrt{6}$

Examine Selected Samples in Marlik Area

The statue of the pottery cow found in the excavations of Marlik Cemetery is approximately 30 cm long and 20 cm high. (Fig. 4) This sculpture has suffered less damage and no fractures. The statue color is reddish brown. The creator of this clay sculpture has tried to create a different work beyond the realistic attitude by combining two realistic and abstract attitudes. This type of design refers to the artist's creativity and typology. In fact, the designer's method is not just imitation but adaptation of nature (external element) and creative mind (internal element). The snout of the animal is made in the shape of a gutter and the horns are inclined upwards. Beneath the animal's horns are ears with a circular hole with golden earrings. In the back of the animal, a large, conical cone is seen, which is exaggerated.

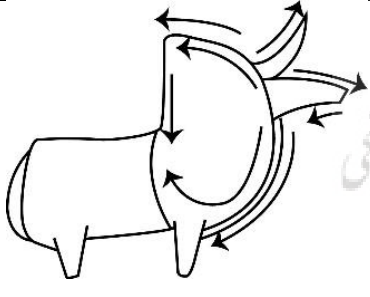
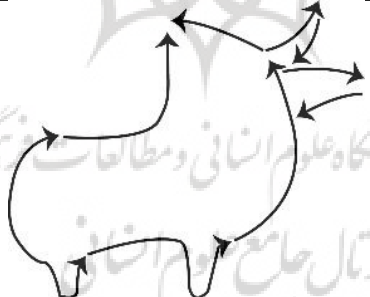
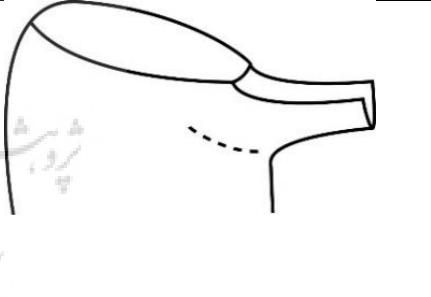


Fig. 4. Pottery statue, Marlik Ancient Area
Source: (Negahban, 1999: 372)

Exaggeration in these figures inspires the animal's strength, greatness and health. In this work, an attempt has been made to observe the fit between the components of the statue and the whole statue. The animal's statues is narrow and the curvature of its back is drawn with a soft arch. The legs are small and conical. The lines that make up this work are free-flowing and give the viewer a good eye rotation. When we look at the animal's statue from the side view, we see the main shapes and lines of movement and the heaviness of the work on the front of the

statue and the visual heaviness is not compensated on the back, so we feel unbalanced and unstable. Induces. In Table (1), the linear relationships of the clay statue as well as its constituent environmental lines have been studied. The free and fluent lines (marked with an arrow in the head and neck section well reflect the animal's overt and covert relationships. Figure (A) Also, the coordinates of the snout and hump parts can be seen in the pictures in Table (1).

Table 1. Guide lines in the Martian cow statue shown in Figure 4 (Authors)

Figure A	Figure B	Figure C
		
<p>Smooth lines on the head and neck that reflect the animal's open and hidden statue relationships</p>	<p>The perimeter lines marked with arrows are well coordinated on the outside of the statue, affecting the beauty of the animal's limbs.</p>	<p>The beginning line of the snout is in line with the end of the hump.</p>

According to Figure 5 and detailed studies from different angles of this statue, we see the golden proportions in this work. By drawing

a square, the index is obtained on the back of the rectangular animal $\sqrt{2}$, through the diameter of the rectangle $\sqrt{2}$ and using the arc

drawn from this diameter, the rectangle $\sqrt{3}$ is obtained, and thus through the diameter of the rectangle $\sqrt{3}$ and $\sqrt{4}$, we see the formation of rectangles $\sqrt{4}$ and $\sqrt{5}$. According to these proportions and the resulting rectangles, it is observed that the parts of the animal's hump, horn and snout, each of which are located approximately and approximately within the rectangles $\sqrt{2}$, $\sqrt{3}$ and $\sqrt{5}$, respectively. Therefore, it can be said that this work is considered a successful work in terms of golden proportions.

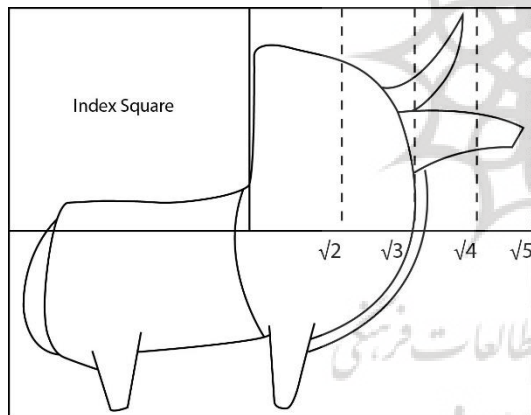


Fig. 5. Existence of index square and $\sqrt{2}$, $\sqrt{3}$, $\sqrt{4}$ and $\sqrt{5}$ in the clay cow statue from the side view

Another study is a clay sculpture of a cow (Fig. 6), measuring approximately 28 centimeters in length and 21 centimeters in height. Has been repaired. The surface of the statue is dark gray, which is quite hot. The snout of the animal is made in the form of a

gutter and is open and the horns are upwards. Behind the animal is a large, cone-shaped animal. The buttocks of the animal's statue are large and round. At the bottom, we see the animal's legs and venom. The sculpture, which depicts a young animal with an exaggerated hump, shows well the strength and power, which is an important feature of this animal. (Fig. 6)



Fig. 6. Image of the statue of a pottery cow from the ancient Marlik region, (Negahban, 1999: 370)

The artist who created this work in the design of the cow's statue, with a realistic attitude, has dealt with its characterization. Unlike the previous image (Fig. 4), which has seen a combination of both realistic and abstract perspectives, Figure 6 shows the animal's physical agility and physical strength by selecting and drawing a more realistic animal.

Also, performing in the rhythm of peripheral lines (in the cow statue) and the soft movement of the peripheral lines with coordination and variety in movement is observed in a desirable way. Guide lines (flashbacks) well reflect the variety of lines, tastes and dynamics that characterize the figure of a cow. (Fig. 7)

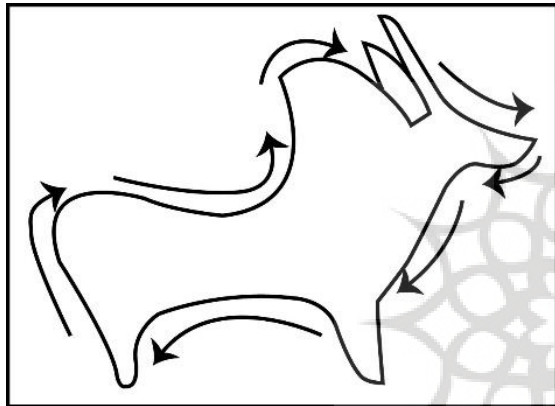


Fig. 7. Survey of guide lines in the clay pottery figure from the side view

Studying the side part of the mountain cow's cow in Figure 8, we see that there is a golden fit in this sculpture, so that if we draw an index square in the back of the animal (mountain) and create a rectangle $\sqrt{2}$ through the index square, then Reach the rectangle $\sqrt{2}$ through the diameter of the rectangle $\sqrt{3}$, and similarly reach the rectangle $\sqrt{3}$ through the diameter of the rectangle $\sqrt{4}$ and the rectangle $\sqrt{4}$ from the diameter of the rectangle $\sqrt{5}$ that

we see. The protruding part of the mountain in rectangle $\sqrt{2}$, the part of the horns in rectangle $\sqrt{3}$, and the face and snout of the animal are in harmony with the rectangle $\sqrt{5}$, respectively.

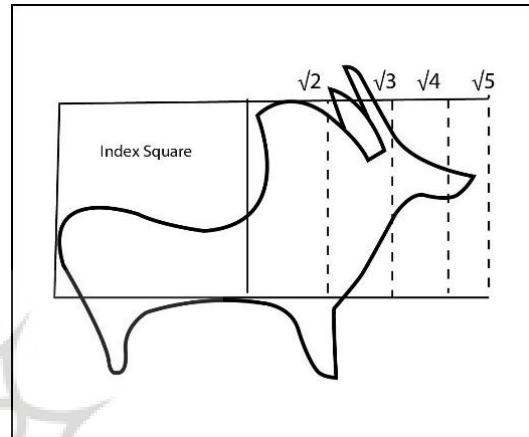


Fig. 8. Examining the golden proportions in the clay pottery figure from the side view



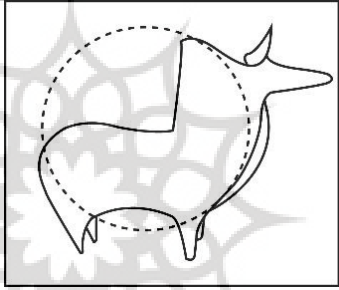
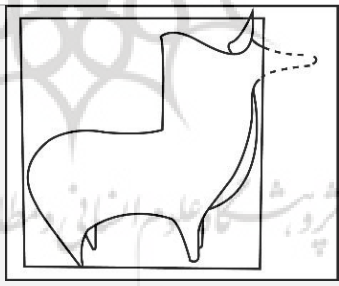
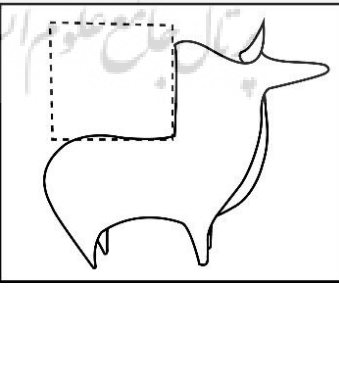
Fig. 9. From the statue of a mountaineering clay cow, ancient Marlik site, (Metropolitan Museum)

The statue of the transported cow (Figure9) found in the excavations of the graves in the Marlik region is of healthy and less damaged sculptures that do not show any fractures.

The statue has short and upward horns, and the animal's snout is open and conical. The animal's ear on either side of the head with a hole in it that holds a gold earring. The whole statue is surrounded by two shapes, a circle and a square. (Figure A and B in Table 2) As well as part of the statue in the process of its composition, it has a hidden square that is

shown in Figure (C). Combination studies suggest that part of the animal's statue lines are in perfect harmony with the circle, and the linear range is shown in the main part of the statue (Figure A) and in Figure (B) the generalities and shape of the environment. (And periphery) The statue is surrounded by a static base.

Table 2. Display of hidden geometry related to the image of the Marlik cow associated with the (Fig. 9)

Fig. A			
Fig.B			
Fig.C			

As can be seen, the potter artist was able to create a beautiful work with relative proportions using simple geometric shapes. Below the neck and chest, there is a prominent line that is probably a chin. (Figure A in Table 2) There is a bulge on the back of the animal, which is shown as a mountain with a curved line, which visually extends along the curved line below the neck and chest line to the viewer's eye. In fact, the Marlik cow pottery has a hidden geometry, the result of which is its unique beauty. In Figure (10), the lines and the outer range of the figure have softness, the curvature of an extra attractive appendage (under the neck), and in general and partial harmony with the lines, and all of them show the aesthetics and hidden structure of the work to the audience.

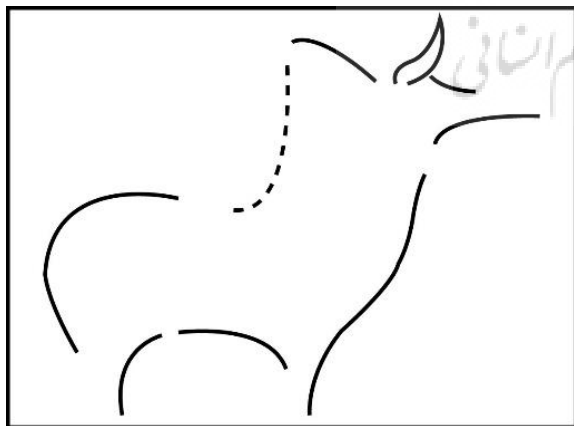


Fig. 10 Examining the lines and eye rotation in the clay pottery figure from the side view

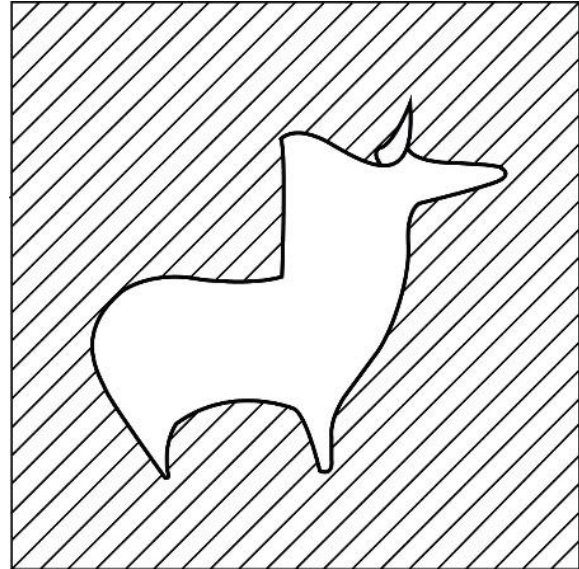


Fig. 11. Formal analysis of the positive and negative space of the clay pottery statue from the side view



Fig. 12. Pottery statue, Marlik Ancient Area, (Negahban, 1999: 374)

In addition to the above, according to Figure 11, a kind of visual value can be seen in the volume range of the cow statue. If we consider

the cow statue as a *positive space*² and place it in a square frame, the *negative space*³ (hachurelines) will appear with a suitable range. The reason for the dynamism and diversity of this range in negative space is the visual quality and balance of positive space (volume dynamics in the cow statue), and also the amount of negative space range (hachure lines) in the square box is the same as the positive space range (statue). And this reveals another dimension of linear aesthetics.

It goes without saying that the Marlik cow figures are not all harmonious and do not follow the golden ratio. The cow figure in Figure 12 has an unusual stretch and length. And it does not follow the golden ratio of $\sqrt{2}$ and $\sqrt{3}$, the side view of the statue, although it has curved and attractive lines, but in the details of this work, inappropriate proportions can be seen.

Of course, in the works discovered by Marlik, much weaker bodies have been found. Clay statue in Figure 14, the Marlik cow family

is ultimately wonky, crooked and unbalanced, and there is no visual aesthetics. Perhaps the reason is the initial process and the initial evolution of the formation of this type of statue. Rough bodies with unbalanced lines and dimensions along with the thickness of the legs and arms and the shape of an uncoordinated mountain with a small head where there is no creativity and taste of the artist and those previous values in Marlik cows (Figures 4, 6 and 9) and The beautiful proportions are completely distorted in detail. Even with the rule of golden proportions (as shown in Figure 15), the beauty of this work is not very pleasant. As we can see, by plotting the index square on the back of the animal and creating rectangles $\sqrt{2}$ and $\sqrt{3}$, we see that each of these rectangles is drawn in the space between the lines of the animal's statue and has no proportion to these rectangles. He concluded that the golden ratio was not used in this statue. Also in Figure 16 of the facing view, we see that if the animal's

² Positive space is the main theme of the subject in any work of art, in which the artist's idea is displayed, also called the occupied space.

³ Negative space to the part of the work that surrounds the space around the subject. Positive and negative pressure in a successful work of art together find meaning and complement each other.

head is in the index square box, the rectangular lines $\sqrt{2}$ and $\sqrt{3}$ are located in the space between the end lines of the animal's legs and abdomen.

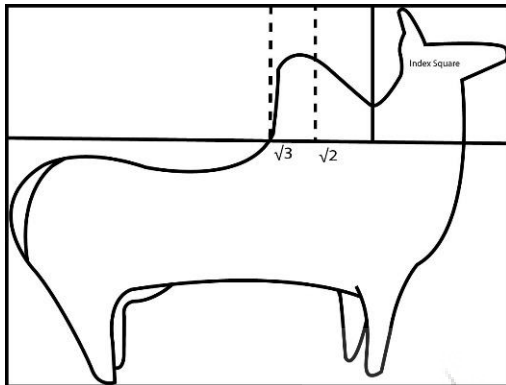


Fig. 13. Study of the golden proportion of pottery from the side view



Fig. 14. Pottery statue of Marlik ancient region, (Negahban, 1999: 361)

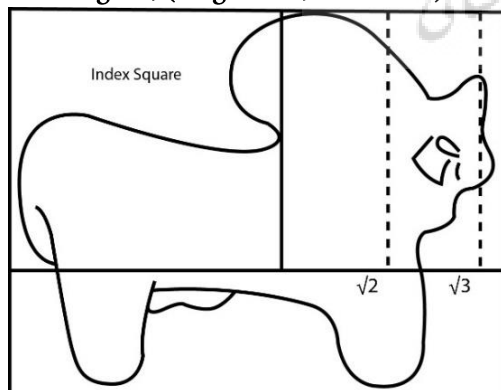


Fig. 15. Studying the golden proportion in pottery from the side view

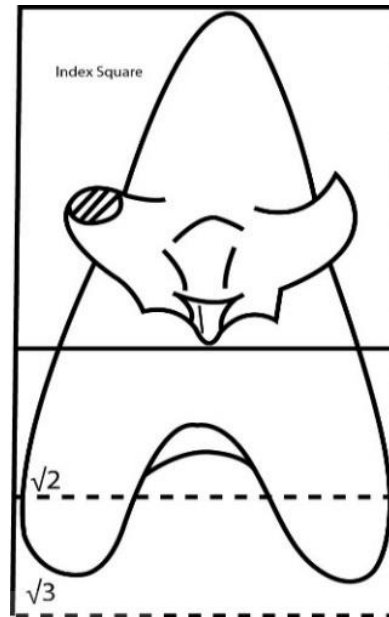


Fig. 16. Investigating the Golden Proportion in Pottery from the Facade

A light brown clay pottery has been discovered in the Marlik area. (Figure 17) On the animal's statue are carved circular motifs that form a beautiful motif. The animal's snout is open-faced and conical. The horns are relatively short on the animal's head. The asymmetry in this figure is quite evident from both the side view and the facing view. In making this work, the potter did not pay attention to the size and dimensions of the animal's statue proportions, and we see the incompatibility of the components of this statue in comparison with the whole work. The exaggeration in making and paying for the animal's horn and snout

has been unsuccessful. Also, according to the studies done in the proportions of this work, it can be said that the golden proportion has not been observed in this work. According to Figure 18, there is no golden ratio in the side view of the design of this statue. To investigate this effect, the index square is drawn on the back of the animal, and according to it, the rectangle $\sqrt{2}$, $\sqrt{3}$, $\sqrt{4}$ is obtained, none of which is related to the lines of the figure, and even the rectangle $\sqrt{4}$ is outside the frame.

Another feature of this work is the non-static effect, which is quite understandable by looking at the side view image. The statue has a forward motion that strengthens the feeling of imbalance in the viewer.



Fig. 17. Pottery cow statue Marlik Ancient Area. (Negahban, 1999: 356)

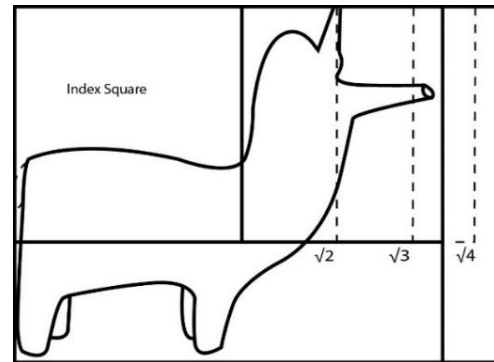


Fig. 18. Investigating the golden Proportion in the Pottery cow statue from the side view

As can be seen in Figure (19), this work does not follow the golden ratio of the facing view and the lines of the radical rectangles $\sqrt{2}$, $\sqrt{3}$, $\sqrt{4}$ and $\sqrt{5}$ are not related to the main lines of the animal's statue design and are completely in our space between the rectangles.

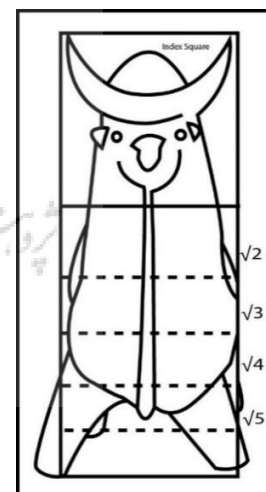


Fig. 19. Investigating the Golden Proportion in the Pottery cow statue from the Façade

Conclusion

Marlik Hill is one of the ancient regions in northern Iran, which dates back to the late

second millennium and early first millennium BC. Among the various artifacts discovered on Marlik Hill are unique pottery. In the process of recognizing and analyzing pottery, two realistic and abstract attitudes (simplified forms) are observed.


In addition to the above, in order to answer the research question and its hypothesis, results have been obtained regarding the golden proportion and visual element of the line (as a range). It can be said that the sizes of $\sqrt{2}$ and $\sqrt{3}$ in the dimensions of the linear range of Marlik cows show the intelligence and intelligence of the designers of that time. Although the design and fit of Marlik pottery figures are often sensory and instinctive, they are in good harmony with the size and rule of the golden Proportion. Of the total of 6 bodies examined, 3 clay bodies followed $\sqrt{2}$, $\sqrt{3}$, $\sqrt{4}$ and $\sqrt{5}$, and the other three bodies are without accurate proportions. Regarding the visual element of the line (as a linear range), it can be said that apart from images 14 and 17, other lines have fluid flow and coordination and play a decisive

role in increasing the dimensions of the sculptures. Around the statues, it is in complete connection and unity, and the role of positive and negative space for achieving balance and stability is obvious. Exaggeration, cuts and dynamism in the perimeter lines of the statues, including the hump, snout, chest and neck, have contributed greatly to the golden ratio and have enhanced the visual quality of the works. In addition to the above, other results of the presence of linear range in the body of humpback cow have been observed, including a realistic attitude with animal characterization and body agility and physical strength (Fig. 6) and the reflection of linear essence (originality of form) in Figure 10 to Along with the overlap of identical positive and negative space to create balance (Fig. 11), shows another dimension of aesthetics in this linear range. It goes without saying that in some sculptures (such as Fig. 12), the artist's attention and emphasis on the unusual appearance of the body and distortion of the body, distorts the visual appeal and creates an inappropriate effect.

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بازشناسی تناسب طلایی در پیکره گاوهای کوهاندار گورستان مارلیک

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چکیده: مطالعه در زوایای پنهان و آشکار آثار هنری ایران، از جمله آثار مکشوف منطقه باستانی مارلیک، نشان از میراث غنی این سرزمین دارد. تپه باستانی مارلیک با وجود ابزارها و ظروف و به ویژه پیکره‌های سفالی به سبب ظرافت و زیبایی خاص، همچنان قابل کنکاش و واکاوی است. هدف از این تحقیق برخورداری از معیار تناسب و گستره خطی در گاوهای سفالی مارلیک و آشنایی با زوایای پنهان آن است. در این خصوص، این پرسش طرح شده است که استفاده از تناسب طلایی و عنصر بصری خط (به عنوان یک گستره) چگونه در ابعاد و اندازه‌های پیکره‌های سفالی پدیدار می‌شوند؟ در این خصوص تعداد ۶ پیکره شاخص از گورستان، مارلیک بررسی شده‌اند و نتایج به دست آمده نشان داد که ۳ پیکره سفالی از معیار تناسب طلایی $\sqrt{2}$ ، $\sqrt{3}$ ، $\sqrt{4}$ و $\sqrt{5}$ تبعیت میکنند و از گستره خطی مناسب بهره‌مند بوده و توازن خطی، اغراق و هماهنگی در آنها قابل مشاهده است. در این روند ۳ پیکره دیگر به لحاظ اندازه و ابعاد از این جذابیت برخوردار نبوده و دارای ظرافت ساخت و طراحی نیستند. علاوه بر آن دو عامل تناسب و گستره خطی در وحدت کامل بوده و نقش فضای مثبت و منفی برای رسیدن به تعادل بارز است. روش تحقیق در این پژوهش به روش توصیفی-تحلیلی بوده و گردآوری اطلاعات به صورت اسنادی است و در تحلیل داده‌ها از رهیافت تناسب طلایی استفاده شده است.

واژه‌های کلیدی: گاوهای سفالی، محوطه باستانی مارلیک، تناسب طلایی، گستره خطی، زیبایی‌شناسی.



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