

OPTICAL ILLUSION PHENOMENON IN THE ISLAMIC ART

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ABSTRACT

In this article I will deal with optical illusion in Islamic art, one of the most important phenomenon in it. This phenomenon is also called the "Optical art"⁽¹⁾, which appeared in various artistic aspects such as the difference in view in accordance with the position of the viewer, far or near (with the variety of mass patterns). Abstractions can lead to a difficulty in determining the elements unless one concentrates while looking at the work of art. The extreme evolution of the designs of Arabic inscriptions, the extreme evolution of geometrical designs, and the interlacement between all decorations and the high ability in using the colours and their tones. All these things may lead to a difficulty in reading the piece of art; On the other hand, they add to the aesthetic value.

PREFACE:

Many scholars think that the Greeks were the first that used the optical illusion. Because they, for instance, were building their temples with slanted roof which gave illusion that the temple was actually standing straight. They also made the columns bulge to look like, from a distance, as if they are perfectly proportioned.⁽²⁾

Needless to say, a great number of scholars have studied the features⁽³⁾ of Islamic art such as: abstraction, modification, colours, elements (calligraphy, floral ornaments, geometric designs, figures, animals and birds, arabesque, architecture elements ...etc.), and material (architecture, marble, mosaic, metals, glass ... etc.).Although scholars of Islamic arts focused on all of the above mentioned features, no one referred to the optical illusion in Islamic art .

In addition, many important general aspects characterize the Islamic art⁽⁴⁾. It has been widened to cover the entire Islamic world. It has been development as from the beginning of Islam up to now. The Muslim artistes have used different sorts of material, they are also innovated many styles, which have special characteristics whether in features, elements or aesthetic value.

We can observe the relationship between various aspects of the Islamic art and "Optical art". V. Vasarely (1908-1997)⁽⁵⁾, Hungarian artist who one of the Pioneers of this modern art, remarks, the piece of art is nothing but mathematical equations that can be formed and reformed at one time. In fact this what the Muslims artists have created. In this respect, J.Bronowski (1908:1976)⁽⁶⁾ maintains that, The artist and math. Scientist becomes one individual in the Islamic civilisation. The geometrical patterns represent the climax of the Arab discovery of the depths of the space and symmetrical levels.

THE IMPORTANT FACTORS THAT LED TO APPEARANCE OF THIS PHENOMENON IN THE ISLAMIC ART:

1) Islamic religion and spirit of the Islamic civilisation:

Regarding the Islamic art, the influence of Islam on the spirit of the Muslim artist has shown itself in two principles that led to the appearance of the optical illusion. These two principles are:

a) Breaking the rules of the nature by means of adjusting the reality, modifying its particular aspects, and changing its proportions and its dimensions according to the vision of the Islamic artist .By doing this, the artist was able to find anew formula in which he dealt with nature and deconstructed its primary elements in order to be able to reconstruct it a new with the aim of promoting its essential traits.

b) The abstraction⁽⁷⁾ the Muslim artists formed their figures almost in an abstracted way, where they depended on the geometrical shapes, outward lines, colours and at the same time they had disregarded the details:.

2) Deep analysis of visual perceptions.

Islamic scientists, specially physicians refer to these perceptions, Badr al-deen Ibn al- Mozafer (13th century), one of Islamic physicians mentions in his book "Mofrah al-Nafs" (self exhilarating)⁽⁸⁾, many people think that the eyes recognizes the colours only, this is untrue, it can perceive about twenty eight perceptions, Such as: colours, light, dark , shadow, transparent, farness, closeness, setting , shape ,spreading out, convergence, movement, constancy, touching, aspiration, denseness, size or volume, number, beauty, ugly, joviality, laughing, weeping, moisture or liquidness, solidity, variation and multitude. All these perceptions were known in the ages of Ibn al_Mozafer and ages before him⁽⁹⁾.

3) knowledge⁽¹⁰⁾ of the real dichromate and the superficial dichromate⁽¹¹⁾:

It is worthy to mention that the Islamic civilization contributed with an enormous Development in the science of optics. Ibn_Sina (370:427A.H.)(980-1036A.D.))⁽¹²⁾ is considered the first Muslim scientist who classifies several measures between

the degrees of the white, the black and the slight dichromate, he sets successive arrangement for colours, grading from white approaching the black, it is considered the first attempt to set a special classification of the dichromate⁽¹³⁾. On another hand, Ibn al_Haytham (354:430 A. H.) (965-1039 A.D)⁽¹⁴⁾ has greatly contributed in the optics science, he also interested by the dichromate, he performed experimental tests on turning of the disc which divided into different chromatic sectors⁽¹⁵⁾, as he studied the effect of variations of backdrops on appearance of dichromate, he has described the degrees of dichromate and distinguished between the superficial dichromate and real dichromate.

THE DIFFERENT APPROACHES AND THE DIRECTIONS OF THE OPTICAL ILLUSION IN ISLAMIC ART

1) The optical illusion in the figures:

The Muslim artist created many aspects which led to the optical illusion in the figures, he used some tricks, for example he sometimes repeats the same figure or subject, and creates some differences between them, so one finds out the difference with difficulty, we can notice this emerged aspect in many examples such as:

Figure1:

Bowl ,Iran, ⁽¹⁶⁾ Nishapur, 10-11th century,

Slip-painted ware, H.16.8cm

Daim.,41cm

Assession no.pot 1623

This bowl present a variation on the theme of "confronted Bird"⁽¹⁷⁾,Here ,Their bodies pointed in opposite directions and their heads face back wards ,they have elongated bodies and tails bifurcated like a sword with a split blade, the centre of the bowl, has been adorned with a small bird.

This fine piece contains several aspects of the optical illusion such as:

- 1) The one who see the piece for the first time can notice the two elegant birds (Fig.1-1) that surrounded by the centre as the same. But if he concentrates, he can find out many differences between them, especially in size, colours, general design and details in the heads, bodies, and wings.
- 2) The small bird (Fig. 1-2) in the centre can be a bird with two outspread wings, and at the same time, it can be a bird with three heads because of the similarity between the wings and the head.
- 3) The using of brownish-black colour for the birds and the white colour for the background are making a contrast lend a feeling of depth.



Fig. 1-1



Fig. 1-2

Figure 2:

Prayer carpet, Wool. ⁽¹⁸⁾ Turkey, Ottoman, Bursa or Istanbul, Dating, Late 15 century. Dimension, 68X50 inch Museum for Islamic art, Berlin.



Fig. 2-1

We can see many aspects of the optical illusion in this piece such as:

a) If we see this piece for the first time we will find difficulty to recognize the content of the drawing inside the two hexagonal shapes (phoenix and dragon). (Fig. 2-1)



Fig. 2-2

b) Although the two hexagonal shapes contain the same subject, there are several differences between them such as:



Fig. 2-3

1) The phoenix in upper shape is different from the bottom one in many parts, as heads, bodies and wings, especially in size, colours, general design and details. (Fig. 2-2) , (Fig. 2-3)
2) Also there are many differences between the dragon in the two shapes



Fig. 2-4

especially in size, colours, general design and details, in heads, bodies, tails and talons. (Fig. 2-4), (Fig. 2-5)

I think that the viewer can't confine all the differences by accuracy in the two shapes. On another hand, Muslim artists used the abstraction, intertwinement and



Fig. 2-5

interlacement of its artistic elements to create a piece of art that characterizes by the mystery and optical illusion, this gives the possibility that many elements can form different shapes depending on the angle, and the distance from which you can see.

Figure 3 :

Marble Panel,⁽¹⁹⁾

Museum of Islamic art in cairo ,Mia
2785

From the madrassa of Saraghatmish,
Mamluk Period, 1356A.D

The central medallion (Fig.3-1) is an extraordinary piece of design⁽²⁰⁾, displaying a variety of objects which we can discover them hardly, such as, two cornucopia in close proximity to tendrils in the form of human hands, a long-tailed pheasant-like birds, but where which could equally be abstract vegetal.

In addition that the decoration is the most splendid kind and we can observe many aspects of the optical illusion, in order to explain that we can ask some questions like:

- Please, try to...

- 1) Define the key for this piece?
- 2) Confine the number of objects in this piece?
- 3) Confine the number of birds in this piece?

(Fig. 3-2,3,4)

Note:

convert the piece.



Fig. 3-1



Fig. 3-2



Fig. 3-4



Fig. 3-3



Figure 4:

Wood door was covered with decorated copper ⁽²¹⁾.

Museum of Islamic art , in Cairo.

From the Mosque of Sultan Barsbay , north of Cairo.

Dating, 1436AD/840H..

Height, 370cm & Wide,210 cm

The decoration of this door looks like the previous marble panel, it contains a central medallion (Fig. 4-1) include a variety of objects which we can discover them hardly, we can discover many aspects of the optical illusion, in order to clear that we can ask some questions like:

- 1) Define the key of decoration for this piece? (Fig. 4-2)
- 2) Confine the number of animals in this piece? (Fig. 4-3,4,5)
- 3) Confine the number of birds in this piece?

We can hardly notice these figures.

4) The optical illusion in this figure and (Fig. 3) depends on the concentration and the distance which the viewer look from, if the viewer look at the piece from along distance he cant define the figures precisely.

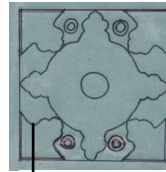


Fig. 4-1

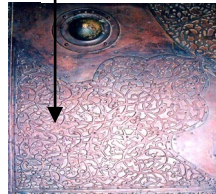


Fig. 4-2



Fig. 4-3



Fig. 4-5



Fig. 4-4

In addition to the interlacement between the elements, the artist could perform another approach to get the optical illusion, when he made the one figure to give multi-figures, to understand these figures we require a great concentration and changing the position of the piece of art.

Figure 5:

Ivory panel,
 Length, 7cm & Wide, 5 cm
 Ayybid period (Late 6th century and beginning 7th century)
 Museum of Islamic art in Cairo, 1333/39

This small Ivory panel is decorated with an abstract two headed eagle (Fig. 5-1); each of the two heads is depicted feeding a small bird within an almond-shaped medallion on a top of each wing.

Although this piece represents a figure of two headed eagle,

the artist could create several figures like:

- 1) Two small birds on atop of each wing. (Fig. 5-3)
- 2) Another two birds (as background) between the two headed of eagle and the small birds of wings. (No. 1,2)
- 3) On the chest of the eagle there is a crescent with decoration like ahead of lion inside a circle. (No. 3)
- 4) There are two small birds between the talons of the eagle. (Fig. 5-4)
- 5) If we concentrate in centre of the eagle, we will observe the intertwinement between the necks of the two heads of eagle and the tails of the small birds. (Fig. 5-2)

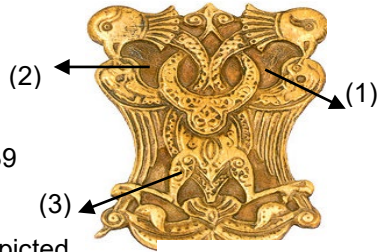


Fig. 5-1

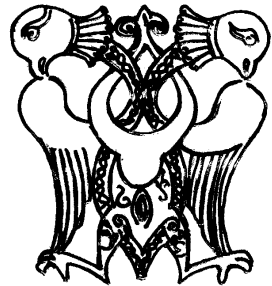


Fig. 5-2

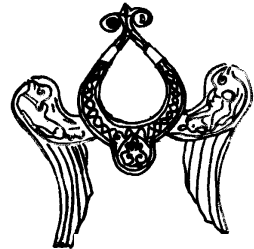


Fig. 5-3



Fig. 5-4

Figure 6 :

Plate , ceramic, glazed .
Faiyum style,
11th century AD,
Islamic ceramic Museum in Cairo
(13307)

Dimensions:H.:95cm Diam.:31cm
This glazed plate made of Faiyum pottery has a white background ,in its centre is the drawing of a bird ,abstracted from the nature, the bird is surrounded by a stylized floral branch and the edge of the plate is decorated with honey, black ,and green colours.
The illusion in this plate can be seen in many aspects:

- 1) The bird in the centre can be seen as young bird with a short neck and two long legs. In another hand, (Fig. 6-1.2)
- 2) If we inverted this piece, we can see a big bird with tall neck and two short legs. (Fig. 6-3,4)
- 3) The abstracted shape that is in black, and green colour on white background which surrounded by the bird give us the feeling of depth.
- 4) This kind of optical illusion in Islamic art which depend on changing of the direction of the viewing is earlier than what is called in modern art "the Duck - Rabbit illusion" (22)

(1)



Fig. 6-1

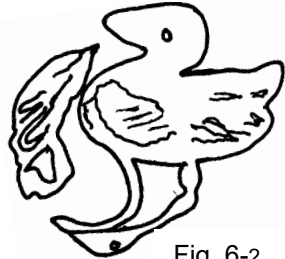


Fig. 6-2



Fig. 6-3

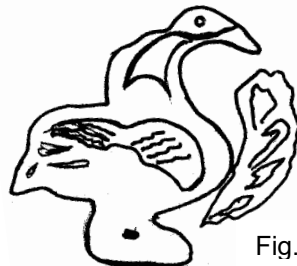


Fig. 6-4

Figure 7 :

Filter of water jug.⁽²³⁾

Fatimid , 11th century AD

Islamic ceramics Museum , in Cairo.

Dimensions:H.:8.8cm Diam.:11.5cm.

This unglazed pottery filter of water jug indicates the skilfulness of the Muslim artist and how he could decorated such a marvellous figure of a peacock on such a small surface, the feathers of tail of a peacock is spreading in a semicircular shape (Fig. 7-1,2), beautifully arranged and adorned with circles. We can notice the optical illusion in this piece such as:



Fig. 7-1

1. If we inverted the figure of the peacock, we will find out another shape of peacock (Fig. 7-3)

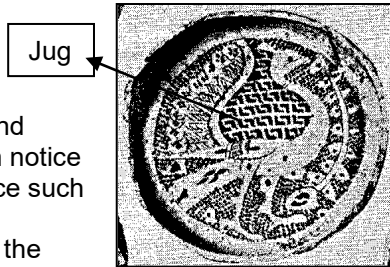


Fig. 7-2

2. The area which was surrounded by the neck and the tail of the peacock look like the shape of water jug (Fig. 7-2)
3. The holes which were used as a backdrop characterise by multitude and variation which leads to the sense of depth.

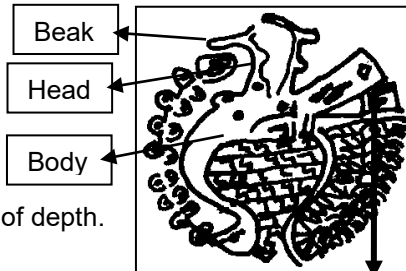


Fig. 7-3

Tail

The abstraction considers the main factor which can lead to the clarity of the optical illusion in Islamic art where we find great difficulty to define the subject and elements of the pieces for example:

Figure 8 :

Bowl,
Tenth century.
Earthenware,
lustre painted
decoration.
on an opaque
overglaze.

Dimensions,H.:9.9 cm W.:31.8 cm
Diam.(base):12.5 cm.

Alphonse Kann collection, Michel
Maurice Bokanowski, 1949. MAO, 23

Reference⁽²⁴⁾:

Louvre museum.

This bowl is
characterized with abstraction which
leads to mystery
and the difficulty
on reading , or
reading in several aspects maybe we
agree or disagree, this emphasises
the idea of optical illusion in this
piece, for example we can read it as:

1. Standard-bearer and behind him is a
peacock on a sandy background.
2. Or a fisherman who catches a big fish, behind him is a
peacock on watery background.

standard

standard –
bearing



Fig. 8-1

Peacock

Fish

Fisher Man



Fig. 8-2

Peacock

Figure 9:

Bowl, Iraq, Probably Baghdad ⁽²⁵⁾,
Abbasid period, 10th century.
Daim., 24.2cm, overall: 7.4cm
Classification , Ceramic.
Accession Number , 1959.331.
Cleveland Museum.

This beautiful piece is characterized also with abstraction and interlacement which lead to mystery, illusion and the difficulty in reading for example, try to find out the following:

1. Standard-bearer?.
2. peacock at the back of standard-bearer?
3. peacock at the front of standard-bearer?.



Fig. 9-1

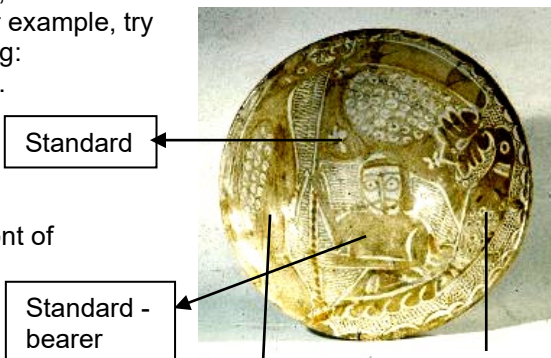


Fig. 9-2

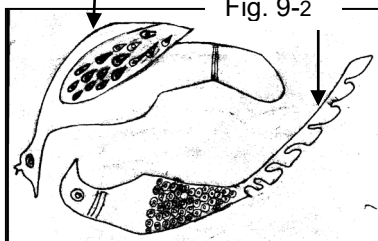


Figure 10:

Donkey with a small bottle⁽²⁶⁾.

Dating, Eighth to ninth century.
Dimension, H.5.4cm, Diam.12.5cm
Purchased, Phokion Jean Tano, in 1930
Museum of Islamic art in Cairo, Mia 9082
Donkey, dromedary or camel?
(No, 1) (Fig 10)



Fig. 10

This highly decorative Object serves a functional purpose, Too. It takes the form of beast of burden, a donkey, dromedary, and a camel. Although it is unclear exactly which one of them the animal carries a basket on its back containing a small bottle intended for perfume or essential oils (No,2) (Fig. 10) , the artist had added to the composition the heads of two other animals over the back (No, 3) (Fig. 10), the illusion in the piece is very clear representing in:

1. The difficulty of define the kind of the animal, if it is Donkey, dromedary or camel.
2. It is hardly for one who sees this vessel for the first time to recognize that is a functional vessel.

Figure 11:

Bowl, Iraq, 9th-10th century
Abbasid opaque white –glazed wares.
H.:6.4cm ,Diam.:22.5cm
Accession no.pot.501
The Nasser D.khalili collection of Islamic art⁽²⁷⁾.
Provenance solheby ,s ,London, 21 April 1980



Fig. 11-1

The inside of the bowl is painted in gold Lustre of a yellow colour on a white ground. The figure of a large bird, with ascender, elongated body and along tail, (Fig. 11-1) a half palmette leaf

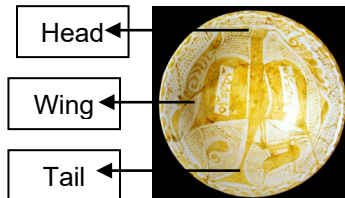


Fig. 11-2

hangs from its beak, while another seems to sprout from the bird's right wing. A quadruped with thin legs, long ear, a tiny, round head and a beak-like snout, appears below the bird to the right (Fig. 11-3) The image is rendered in such an abstract manner that this interpretation is far from certain, it represent a bird of prey descending on its victim, and we can observe the mystique and illusion in many



Fig. 11-3

approaches such as:

- 1) The stringent abstraction is very clear in the bird and the animal.
- 2) There is no proportioning between the bird and its victim.
- 3) The intertwinement and interlacement in all elements, in bird, animal and floral.

Figure 12:

Stucco stained glass windows,
Museum of Islamic art in Cairo, No.454/3
Egypt, Ottoman period, about 16:17th century.
Dimension, L.:92cm W.:70cm

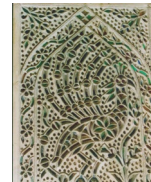


Fig. 12-1

This figure is a window can be seen at House of Sitt Dudu, it is ornamented with a peacock. The tail fans out in a semicircular shape (Fig. 12-2).

The peacock was drawn with abstracted form which leads to difficulty in noticing it, also:

- 1) The intertwinement and interlacement in all elements, in bird, floral decoration and the background.
- 2) The stringent abstraction is very clear in the bird and the floral decoration.

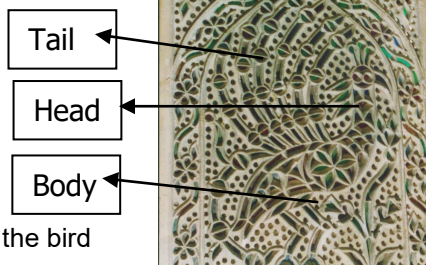


Fig. 12-2

Figure 13:

Bowl, Iran , Probably Amul district ⁽²⁸⁾.
About 11th -12th century.
H., 9.2cm ,Diam.31cm
The Nasser D.khalili collection of Islamic art.
Accession no.pot.94

Can you see a large bird with a curiously angular and elongated body forms the principal motif? One of its wings appears as folded, the other outstretched. There a separate roundel on which the bird appears to perch, the mystery and illusion can be seen in the difficulty of reading such Designs and defining precisely the parts of the bird like head, body, wings. (Fig. 13-2)



Fig. 13-1

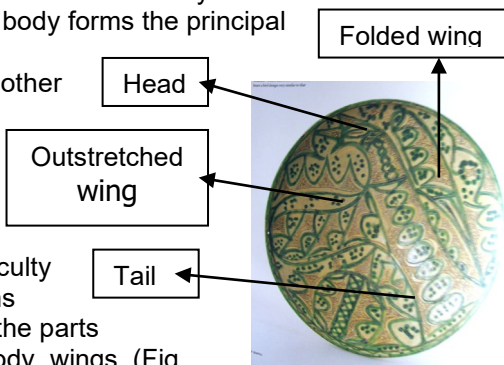


Fig. 13-2

Figure 14 :

A part of perforated wooden comb, Museum of Islamic art, in Cairo (4943)
Dating, Egypt, about 10,11th century.
From, Fustat city excavations.
Dimension,L.:10cm W.:5.5cm.

This beautiful piece is considered another evidence on the skilfulness of Muslim artist, the decoration depends on perforated geometrical decoration and figures, the optical illusion in this piece can be noticed in:

1. The main element is two couples of birds in setting of facing; it is difficult to define parts of the figures (Fig. 14-1) , (Fig. 14-2)



Fig. 14-1

2. This kind of optical illusion in Islamic art which depend on reversible figure and ground is earlier than what is called in modern art "the figure-ground illusion " (29)

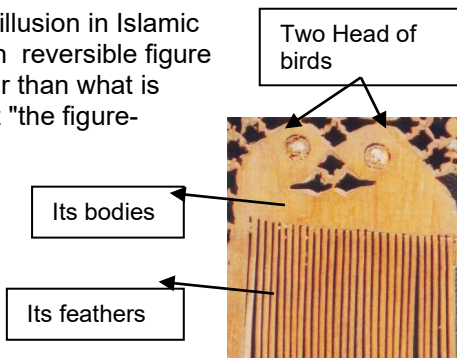


Fig. 14-2

The optical illusion in the art of Arabic inscriptions

The optical illusion in lines considers one of the most obvious aspects of the optical illusion art, at the same time, needless to say that Arabic inscriptions are mainly depend on the different lines, these inscriptions were developed and became more interlaced and complicated, also the Muslim artist could form the Arabic letters as characters, animals and birds and so on. All these features led to the optical illusion.

Figure 15 :

octagonal marble piece⁽³⁰⁾.

Museum of Islamic art, in Cairo (2097)

Bahri Mamluk, 14th century A.D

Diameter: 60cm

This octagonal marble piece is decorated with marble mosaic, the decoration consist of a central circle surrounded by an octagonal "star pattern", there are joined inscription of kufic style containing names of ten of the companions of the Prophet, peace be him, these are the ten persons promised of the paradise.

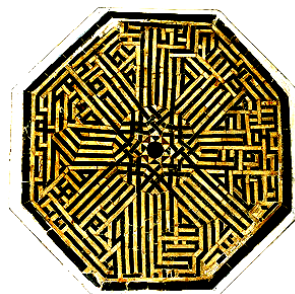


Fig. 15

The optical illusion in this beautiful inscriptive piece (Fig. 15) can be noticed in:

- 1) The difficulty on reading the words of this inscription.
- 2) The difficulty in following the extending of letters and their interlacements.
- 3) The difficulty in confining the geometrical shapes (triangle, square, rectangle, star pattern,.. etc.)
- 4) If we imagine that the black lines is paths, and the white lines is partitions between them these paths will seem as "house of lost way" , which will be difficult to outside from it.
- 5) The artist could depict the inscription to form the famous element in Islamic art "star pattern". (Fig. 15-2)
- 6) The contrast between the black and white colours gives us the sense of depth and the optical illusion.



Fig. 15-2

Figure 16 :

Ceramic tile, Bahri Mamluk ⁽³¹⁾.
 Museum of Islamic art in Cairo. (2076)
 From of Mosque of Sayda Nafisa.
 14th century AD
 Lenth: 44cm

This Mamluk faience tile has a square form, is decorated with blue and black, on the white background, the four rectangles of the frame are inscribed with the a Qur'anic verse in kufic inscription, in the squares of the corners, we can see the signature of the artist "Gheiby Ibn Al-Taorizy", in the central square, there is an inscription with formula "rely on the best supporter", we can regard the optical illusion in this tile in several aspects such as:

- 1) The viewer can turn from the simple inscription in the frame to complex one

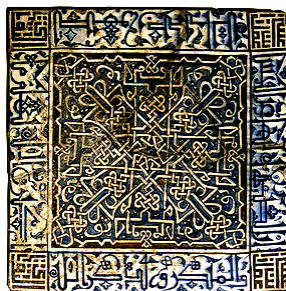


Fig. 16-1



Fig. 16-2

- in the central square or the vice-versa (Fig. 16-1).
- 2) in the centre square (Fig. 16-2), we find difficulty to read the inscriptions, define the key of inscriptions and following the extending of the letters and their interlacements.
 - 3) The artist could form the central inscription as the famous element in the Islamic art which is called "star pattern".

Figure 17 :

A neck of candlestick,
Copper alloy, in laid with gold and silver .

H.:14.5cm, D.:8.5.

Mumluk,1290-93.

Museum of Islamic art in Cairo.

Mia 4463.⁽³²⁾

The Inscription around the neck is animated with anthropomorphic



and zoomorphic figures, the shape consisting of armed soldiers fighting, the inscription reads "perpetual and eternal glory and victory over the enemies".

As for the inscription on the neck ,this is in thuluth script which has been made by the order of the Tishtkhana of the most high royal Al-zayni Zayn Al-Din katbugha al- Mansury ⁽³³⁾,this piece emerge the ability and the great skillfulness of the Muslim artist, and how he depicted the Arabic letters to give such a marvelous figures on such a small area , also the optical illusion in this piece is very clear specially in this inscription around the neck (Fig. 17) , because of :

1. Difficulty in discovering if it is an inscription or not.
2. Difficulty on reading not for the public but also for the scholars.

The optical illusion in the certain colours ⁽³⁴⁾

Certain colours impart a feeling of warmth while others spread coolness around. Colours can be divided into two categories, based on the effect they produce. Hot or warm colours are red, orange, and yellow. Cool colours are Blue, green, and violet. The selection and arrangement of colours in such way gives pleasant, attractive appearance and sensation of depth ⁽³⁵⁾.The experiments proved that the warm colours emerge nearer than reality so, they were called the front colours, on the opposite, the cool colours emerge as farther than reality so, they were called the back colours. This phenomenon leads to feeling of depth ⁽³⁶⁾ .At same the time, the area which was coloured with the warm colours emerge as wider than reality, but the area which was coloured with the cool colours emerge as narrower than reality. All of the above mentioned features lead to the Optical illusion whether in the depth, area and third dimension.

Figure 18 :

Ottoman , prayer rug with columns ⁽³⁷⁾.

Bursa or Istanbul,

Dating , late 16 century.

Dimensions,1.73X1.27m.

Metropolitan Museum of art , New York.

This beautiful carpet was decorated with two sections, the first is a floral frame with floral decorations, coloured with green, yellow and white (Fig. 18-1), and the second is the field which is central rectangle consists of an arcade with three arches resting on double columns, so the area divided into three parts, the columns and arches were coloured with a golden colour, while the central part coloured with black while the brown for the two lateral parts. We can observe the coloured illusion as:

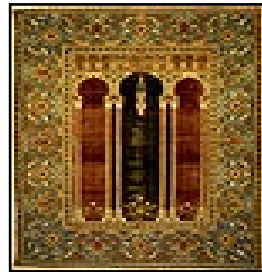


Fig. 18-1

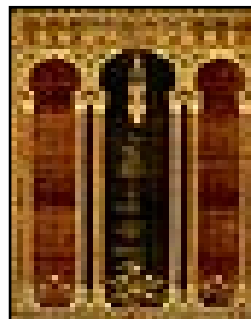


Fig. 18-2

1. The using of black and brown between golden columns and arches make us to feel of depth, as we look through a big window (Fig. 18-2).
2. The gilded mosque lamp in the central part seems to be hung in the space.

Figure 19 :

Bowl ,Alkaline-glazed earthenware painted in.⁽³⁸⁾
 Enamel colours and gift (Minai ware),
 From kashan ,13 century,
 D.:12cm ,H.:5.1cm.

Tehran, Iran Bastan Museum, no.4410

This piece show the ability of the artist in using the colours of brown and yellow on white background, the central circle contains a bird which is swimming, this bird is surrounded by zigzag lines represent the waves (Fig. 19-1)

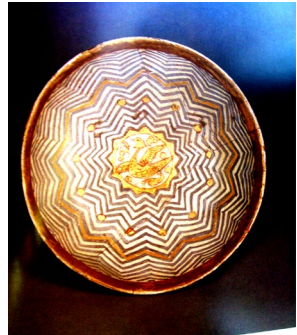


Fig. 19-1

We can notice the optical illusion aspects which depend on colours as the following:

1. The using of brown and yellow on white background makes us to feel of depth.
2. The artist could express on the movement and spreading of the waves by way of successive zigzag lines that surrounded by the bird (Fig. 19-2).



Fig. 19-3



Fig. 19-2

3. The artist could express clearly on the waves as if they had top and bottom in order to emphasise that the artist sowed many yellow dots on the tops (Fig. 19-3).
4. this kind of optical illusion which depends on coloured parallel lines look likes, and earlier than what is called in modern art "Ponzo illusion"⁽³⁹⁾.

Figure 20 :

Small dish, 10th-11th century
Iran or Khorasan or Transoxiana
Slip-painted earthenware,
underglaze slip decoration
H. 4 cm; Diam. 14.8 cm
Purchased 1991

Louvre museum, MAO 857

The ceramicist has used every warm shade of the slip colors - which stand out against a bright white background - to produce a truly spectacular piece, despite its small size, The arrangement of the decoration and the use of complementary colors - warm red-brown and brownish-black tones - give this small piece a truly monumental aspect. The artist has balanced the composition perfectly, placing the design of motifs in three concentric rings surrounding a central circle. These rings are comprised of seven, eleven, and finally sixteen dots, each ring with a line of dots. These dots lend a feeling of depth to the entire composition.



Fig. 20

Figure 21 :

Bottom of the vessel, ceramic.⁽⁴⁰⁾
12th century AD,

Islamic ceramic Museum (6246/3)

Dimensions:H.:25cm Diam.:9.4cm
This pot bottom painted under glazed has a drawing of a bird in dark brown colour on a butter_colored floral background; the bird is spreading its wings, ready to fly. The illusion in this piece can be seen in the abstraction and the interfusion between the bird



Fig. 21-1

spreading its wings, ready to fly. The illusion in this piece can be seen in the abstraction and the interfusion between the bird

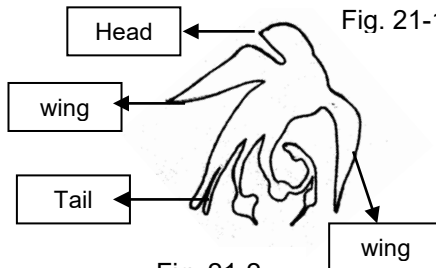


Fig. 21-2

and the floral ornaments, for example the bird's feet, which look like foliage. In addition to the resemblance between the wings and the head of the bird (Fig. 21-2,3). All of this leads to the difference of reading.

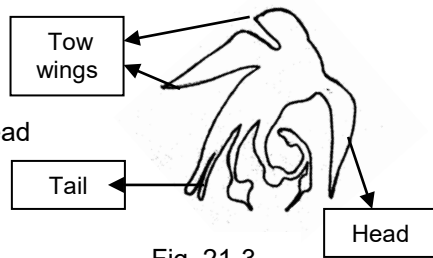


Fig. 21-3

Figure 22 :

Bowl, pottery (41),
12th century AD,
Islamic ceramic Museum
Dimensions: H.:4cm
Diam.:10.5cm

This bowl is an example of Faiyum_Style pottery .the colours are executed by liquefying the colours so that they flow together without leaving a specific line, the artist uses different colours such as



Fig. 22

black, orange and green. The chromatic illusion in this piece is noticed in the chromatic compositions, that were formed as group of figures, these figures were arranged in graduated way, where the biggest one in the front and the less after and so on, that led to the sense of depth.

CONCLUSION

- 1) The optical illusion art was known as simple ideas in Greek period, but in Islamic period became more advanced, and characterized by clearness, depth and variation.
- 2) The spirit of Islam contributed in emerging this phenomenon in Islamic art.
- 3) The optics scientists and physicians contributed also in emerging this phenomenon in Islamic art.
- 4) The optical illusion art appeared in many aspects in the figures, colours, and Arabic inscriptions, Whether on ceramics, glass, ivories, carpets, metals, wood..etc.
- 5) I think that, this research would perhaps be the first study dealing with this subject.
- 6) I wish I could find out new aesthetic values in Islamic art in this research.
- 7) On my opinion, Although the optical illusion in the Islamic art requires more and more studies, we don't find any specialized study on it.

1) Optical art is a mathematically themed form of abstract art, which uses repetition of simple forms and colors to create vibrating effects .moiré patterns, Foreground –background confusion, an exaggerated sense of depth and Other visual effects. Recently, the Op Art /Optical is an American artistic movement appeared in 1960AD, joined by geometrical designs such as square ,rectangular, circle ,lines, points, tone and colours.

-Ahmad Rafat, "*al_Rasm Bl_al_wan Fi al_Qur'an*"(the drawing with colours in holy Qura'n), Al_Gameil publishing, Distribution and Media. P.94.

www.artcyclopedia.com/history/optical.html

www.tagate.com/optical_illusion/greek-history.shtml

2) The majority of the nowadays scholars refer to the Greek origin of this phenomenon, some of them say:" Epicharmus and Protagorus are the two people who invented optical illusions. They lived around 450 B.C." so, because of what Epicharmus

has pointed out: The mind sees and the mind hears. The rest is blind and deaf. Protagorus didn't believe that what Epicharmus said was true, but he says that: Man is nothing but a bundle of sensations". although the optical illusion were well known for Muslims scientists and artists , All of these scholars don't mention any efforts for Muslim scientists and artists So, according to their mentions about the Greek period and modern art:" It took a while for people to realize optical illusions again. Then in 1829 a psychologist named Johannes Mueller wrote two books about visual illusions".

www.tqnyc.org/NYC052034/History.htm

www.lgsd.ca/sciencefair2004project3/history.htm

www.tqnyc.org/NYC052034/History.htm

www.lgsd.ca/sciencefair2004project3/history.htm

www.tagate.com/optical_illusion/greek_history.shtml

www.artcyclopdia.com/history/optical.html

3) Zakî M. Ḥasan, "*Fonon al-Islam*", (the art of Islam) , Cairo, 1948.&

Farîd Shafi'î,"*Zakhārif wa turuz Sāmarrā*"(The ornament and Styles of Sāmarrā),in the Bull. Of the Faculty of arts, Fuaad I ,Univ.,Vol.XIII,part II, (December 1951).

4) Zakî M. Ḥasan, "*Fonon al-Islam*",(the art of Islam),Cairo,1948.&

Farîd Shafi'î,"*Zakhārif wa turuz Sāmarrā*"(The ornament and Styles of Sāmarrā), in the Bull. Of the Faculty of arts, Fuaad I ,Univ.,Vol.XIII,part II, (December 1951).

5) Vasarély, Victor (1908-1997), French painter, sculptor, and graphic artist of Hungarian birth, who is recognized not only as the creator of (Op Art) but of one of the most successful Op Artists. Vasarély's interest in geometrical abstractions, and the potential of using them to produce striking visual effects, began in the late 1940s. The basic components were squares, circles, and triangles, and horizontal and vertical parallel lines; by drawing lines at varying distances from one another and introducing undulations.

Ahamd Rafat, "*al-Rasm Bl al-wan Fi al-Qur'an*"op.cit., P.94.

www.latifm.com/artists/vasarely.html

6) He was a polymath who found both the Arts and the science in interesting and accessible.

J.Bronowski, *Ascent of man*, British Broadcasting corporation, London, 1976.this book was translated by Mwafaq shakhashiro, and was published in *Alam al_Marafa* series, Kwiat,No.39,1981,pp. 127, 131, 132

Ahamd Rafat, "*al_Rasm Bl_al_wan Fi aL_Qur'an*"Op.cit.,67
www.drbronowski.com/

www.amazon.com/Ascent-Man-J-Bron/dp/06131

7) Mahmod Ibrahim Husayn," *al_Zakhrifa al_Islamiyya al_Arabsque*",(The Islamic ornaments, arabesque),1987,p.13

Herzfeld E., *Arabesque Encyclopaedia of Islam* ,vol.I ,London,1921,pp.363-367

Afif Bahnasi,"*Al_Fan Al_Arabi Al_hadeeth byn Al_Hawya wa Al_Taba'aya* ",(Arabic Modern art between the identity and dependency),Dar Al_ktab Al_Arabi, Demascus,1997,pp.15:37

8) J. Christoph Bürgel, *Psychotherapie im islamischen Mittelalter*,FIKRUN WA FANN, Bundesrepublik Deutschland, Hamburg,Nr.14,1969,pp.80, 81, 85 , this Bulletin published in Arabic ,about the copies of this manuscript of Badr al-deen Ibn al- Mozafer (13th century), "*Mofrah al-Nafs* " look also; ,

Fares B., "*Sr al_zakhrifa al_Islamiyya*",(The secret of Islamic ornament),IFAQ,1952 AD.p.32

9) Fares B., "*Sr al_zakhrifa al_Islamiyya*",Op. cit, p.32

10) Abd al_Hamid Abraham, "*Kamos al_Allwan Ind Arab*",(The dictionary at Arabs) ,General Egyptian Library for book,cairo,1989,

Ahamd Rafat, "*al_Rasm Bl_al_wan Fi aL_Qur'an*", Op. cit, p.122:287

11) Michael Barry ,colour and symbolism in Islamic architecture ,Thames and Hudson, p.20

12) Ibn Sina (in Latin Avicenna) authored some 450 books on a wide range of subjects, many of which concentrated on philosophy and medicine, he is considered "the Prince of all Learning" in Arabic Ash-shaikh ar-Ra'is " and is, with Rhazes , the greatest physician of the Islamic world. Avicenna is also considered the father of the fundamental concept of momentum

in physics. George Sarton describe him as the father of the history of science, described Avicenna as "one of the greatest thinkers and medical scholars in history" and called him "the most famous scientist of Islam.

G.C.Anawati &P.Ghalioungui, medical manuscripts of Averroes at El-Escorial ,Al-Ahram Center for scientific translations ,Cairo, 1986,pp.31, 409, 494.

- <http://en.wikipedia.org/wiki/Avicenna>

13) Farida Sha'ban Haydar,"*Usos al_Tarikhaya L_Nazryat al_loon*",(the historical substratums of the theory of colour), The Bulletin of Arts education Faculty ,No.12,2004,p.191, 192.

14) Ibn al-Haytham (Abū 'Alī al-Ḥasan ibn al-Ḥasan ibn al-Haytham) (Birth:965-Death:1039 A.D) was one of the most eminent physicists, whose development of optics and the scientific method are outstanding. Ibn al-Haytham's work on optics is credited with contributing a new emphasis on experiment. His influence on physical sciences in general and optics in particular, has been held in high esteem and, in fact, it ushered in a new era in optical research, both in theory and practice. He wrote the Book of Optics, is regarded as the father of optics and the pioneer of the scientific method, and has been described as the "first scientist", Due to its importance in the history of science; some has considered his development of the scientific method to be the most important scientific development of the second millennium.

G. Lebon, la civilization des arabes ,Bib. De Firmin , Didor Paris ,1988. This book was translated by Adel Za'ter, the title was "*Hadaret al_Arab*" published by General Egyptian Library for book, Cairo,2000,p.473, Lebon says what master Shal said : "the book of optics of Ibn al-Haytham is the source of our knowledge about optics".

J. Bronowski, Op.cit,pp.134, 135

- <http://en.wikipedia.org/wiki/Ibn-al-Haitham>

15)Also,Kamal Al_Din Al_Farrisi (dead :720 H.) tried to Know the reasons of formations of colour and the interperatationthe pseudo visibilities and mirage,and clarifying the image which seems on the surface of millstone when it was coloured with

several colours and rounding rapidly ,it is seemed to be with one colour as a result of the mixture of colours.

Farida Sha'ban Haydar, "*Usos al_Tarikhaya L_Nazryat al_loon*", Op.cit.,191, 192

16) There is another similar example, Bowl lead_glazed , Earthenware painted with coloured slips.(Nishapur),10th century,D.:35.5cm, H.:11.5cm.Tehran,Iran Bastan museum, N(8378).

Robert,J. Charleston, Master pieces of western and near eastern ceramic,Vol.Iv, Islamic pottery, Kodansha, Japan, number. 15

17) Ernst J. Grube, Cobalt and lustre ,The Nasser D.Khalili collection of Islamic art Volume IX, The Naur foundation, London, 1994,p.80

- Robert J. Charleston, Master pieces of western and near eastern ceramics, Vol., Iv, Islamic pottery, Kodansha, ltd.,Japan,1979,No.15

18) Zakî M. Hasan, "*Fonon al_Islam*",Op.cit.,pl.342

19) Bernard O'kane, Op.cit, p.123

Zakî M. Hasan, "*Fonon al_Islam*",Op.cit.,pl.530

20) Bernard O'kane , The Treasures of Islamic art in the Museum of Cairo , A supreme council of Antiquities edition &The American university in Cairo press, Cairo, New York. 123

21) Zakî M. Hasan, "*Fonon al_Islam*",Op.cit.,pl.451

22) Gestalt organization can be used to explain many illusion including the "Duck – Rabbit" illusion where the image as awhile switches back and forth from being a duck then being a rabbit.

- <http://en.wikipedia.org/wiki/ibn-al-Haitham>.

23) Zakî M. Hasan, "*Fonon al_Islam*",Op.cit.,pl.261

24) <http://www.louvre.fr/>

25) <http://www.clevelandart.org/>

26) This fabulous creation is one of a number of similar vessels of Peculiar shape that are known from different collections special in, the important one is a Cage flask , free-blown glass, Donkey with a small bottle. Dating, Eighth to ninth century,

-
- Middle east. Dimension, H.12cm, Diam.11.8cm. Purchased in 1898 A.D, AO.2777.Metropolitan museum, Jonathan Bloom & Sheila Blair, Islamic arts ,phaidon,p.101
www.artlex.com/
- Bernard O'kane, Op. cit, p. 34
- 27) Ernst J.Grube, Cobalt and lustre ,The Nasser D.Khalili collection of Islamic art Volume IX, The Naur foundation, London, 1994,p.23,31
- 28) Ernst J.Grube,Op.cit,p.127
- 29) <http://en.wikipedia.org/wiki/>
- 30) G. Lebon, Op. cit, Arabic copy, pl.219
www.eternal Egypt.org/EternalEgyptweb
- 31) www.eternal Egypt.org/EternalEgyptweb
- 32) Zakî M. Hasan, "*Fonon al-Islam*", Op.cit.,pl.453
Bernard O'kane,Op.cit, p.118
- 33)The base of the candlestick is now in the Walters Museum in Baltimore , Maryland ,U.S.A, Diam:85cm ,H.:14cm.
Bernard O'kane, Op. cit, p.118
- 34) The optical illusion of colours in Islamic art requires several specialized studies.
- 35) www.myinteriordreams.com/color-har-cot.htm
- 36) Ahamd Rafat, "*al-Rasm Bl_al_wan Fi al-Qur'an*", Op. cit, p.115
- 37)Jonathan Bloom & Sheila Blair, ,Op.cit ,p.376
www.artlex.com/
- 38) Robert,J. Charleston Op.cit, , p.60.
- 39) The Ponzo illusion is an example of an illusion which uses monocular cues of depth perception to fool the eye, In the Ponzo illusion the converging parallel lines tell the brain that the image higher in the visual field is further away therefore the brain perceives the image to be larger.
<http://en.wikipedia.org/wiki/>
- 40) www.eternal Egypt.org/EternalEgyptweb
- 41) www.eternal Egypt.org/EternalEgyptweb