NOVATEUR PUBLICATIONS
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY
[IJIERT] ISSN: 2394-3696 Website: ijiert.org
VOLUME 9, ISSUE 11, Nov. -2022

MASTER SHIRIN MURODOV'S DRAWINGS A TYPE OF AXONOMETRY WHICH IS MOST USED

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ANNOTATION
The article analyzes the drawings made by academician of the Academy of Sciences of Uzbekistan usto Shirin Muradov, draws attention to his deep knowledge of the theory of creating drawings.

Keywords: central projection, perspective, axonometry, distortion coefficient along the axonometric axis, oblique isometry, oblique frontal isometry.

In the study of the theory of drawing and drawing that prevailed in the history of the culture of the peoples of Central Asia, the drawings belonging to the work of master Shirin Murodov (1880 (1957)) of the Faculty of Arts of Uzbekistan have a special place. In 1941, master Shirin Murodov in Samarkand, B.NTogether with the Lukashevas, he prepares a training manual "The Art of Ganch Carving" for future masters of construction art[10]. This manual has a special scientific value with more than 230 drawings.Most of the drawings made by master Shirin Muradov were made based on the rules of geometric drawing. in the drawings belonging to this category, there are various such as dividing the cross section of a straight line into equal parts, dividing a circle into equal parts, building shapes related to connections, building a shape symmetrical to a given shape, composing geometric patterns called "gyrix", depicting shadows in geometric drawingsgraphic issues are resolved.when making drawings, it is a matter of special attention to depict objects that have volume through them. How such a problem was solved by designers in the history of Central Asia is noted in one of the serious scientific sources as follows: "..Eastern painting is characterized by stickiness... In the East, the image is created on the basis of axonometric constructions, light and shadow arenot involved ithe image" [9, p. 316].

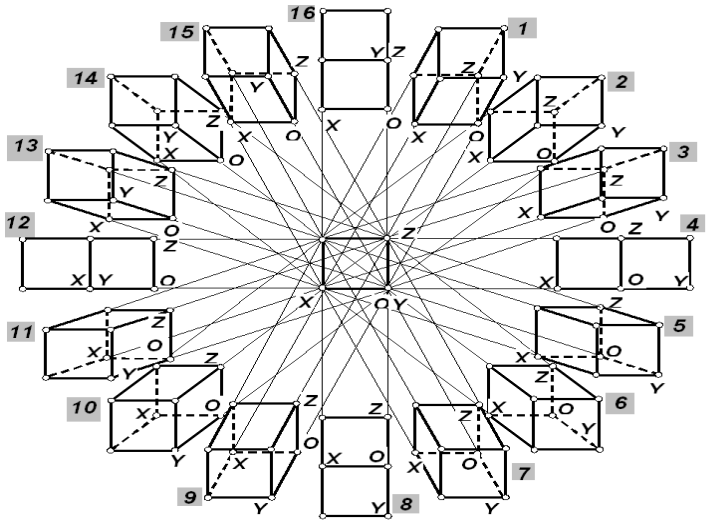

Figure 1. A curve belonging to a single cube angular isometries have different views.

When choosing the type of Axonometry for their drawings, masters preferred axonometries with coefficients of change equal to 1 on all three axes. This type of axonometries could serve as oblique isometries. because in this type of isometries, oblique angles are characteristic of **axonometries** $\mathbf{kx2 + k_y^2 + k_z^2 = 2 + ctg^2\varphi}$ in equality φ if the angle is equal to 45°, the coefficients of change along the axes will be equal to **kx = ky = kz = 1**. But even in this case, there will be an infinite number of oblique angle isometries of a single object [1, pp. 100-101]. Fig. 1 It is shown on what basis 16 of them appear.

Each of the images created in the mentioned way is also called oblique isometry or "**Cavaleri projection**" after the famous Italian mathematician Bonaventura Cavalieri (1598 - 1647).

Some of the oblique isometries shown in Figure 1 are widely used in practice. Some of them also have special names. in particular: **oblique angle isometrics** marked with numbers 5, 7, 9 and 11 as "**military perspective**" or "**vectorial projection**"; Isometries marked with numbers 2 and 14 are called "**frog perspective**" [7].

Let's consider one example of how to choose the best one from an infinite number of oblique isometries

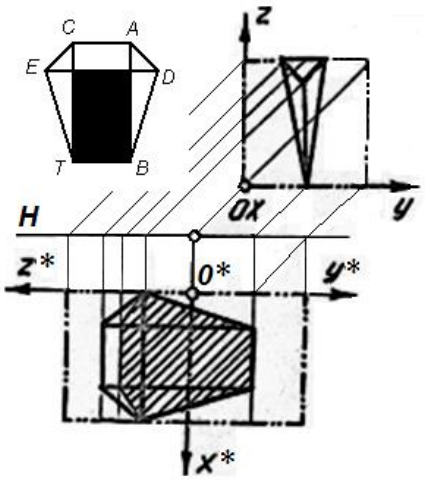

Figure 2. Horizontal isometry with oblique angles.

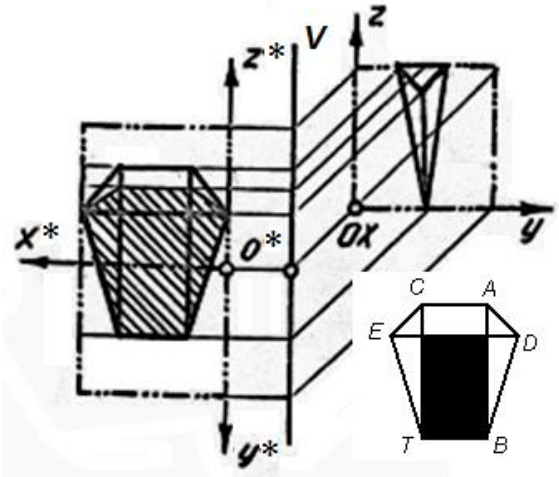

Figure 3. Slanted frontal isometry

A fid with **ABCTED** vertices drawn in Ibn Sina's book "Miyar ul-Uqul" (Fig. 2) [2, p. 48] is placed in a cube of a certain size in such a way that its symmetry planes overlap with the symmetry planes parallel to the sides of the cube. then this bounding cube is combined with a three-dimensional rectangular Cartesian coordinate (RTC) apparatus. integration is carried out between one end of the cube and three edges spread from it between the coordinate origin **O** in the **TBDK** and the **x**, **y** and **z** axes spread from it. The same situation is depicted in the **yz** (profile) projection in Fig. 2.

Then the cube with the object inside it is projected to the horizontal **N** plane at an angle of 45° in the direction parallel to the bisector of the y and **z** axesif the horizontal **N** plane is rotated by 90° around its straight line intersecting with the plane of the drawing paper, then the projection of the inside of the cube together with it is visible. This projection created in this way is called horizontal isometry with oblique angles (Fig.2)

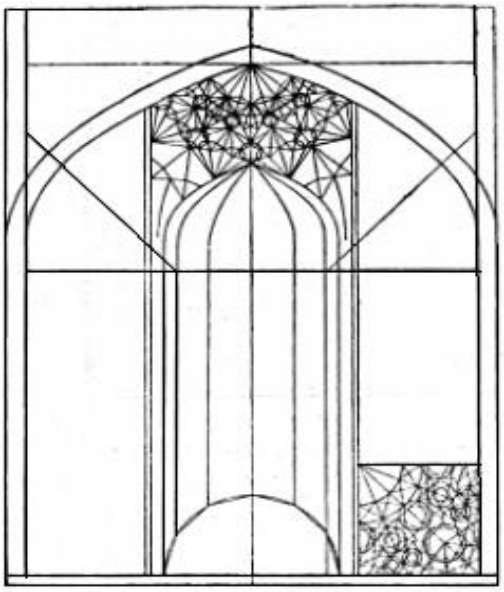

Figure 4. Mihrab drawing made by master Shirin Murodov.

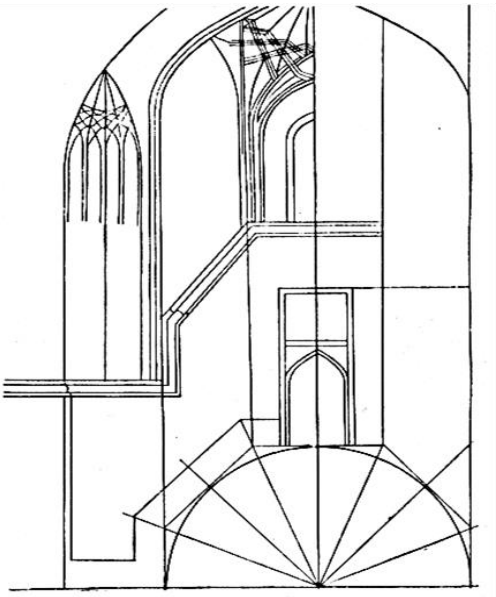

Figure 5. Master Shirin Muradov. Interior drawing.

The projection analysis in Figure 3 confirms that the pona drawing in Ibn Sina's book "Miyar al-Uqul" is **an oblique frontal isometry.** This image corresponds to the situation marked with the number 8 according to the classification in Figure 1.

It is observed that master Shirin Murodov often used frontal isometries with oblique angles in his drawings. Figure 4 shows the drawing of the altar made by Master Shirin Murodov [8, p. 82], and Figure 5 shows the drawing of the interior of the building made by the same master [8, p. 16]. at first glance, these drawings remind some aspects of the objects mentioned in their names ("altar", "interior"), but it makes one wonder how the informationrelated to the dimensions can be obtained based on them.

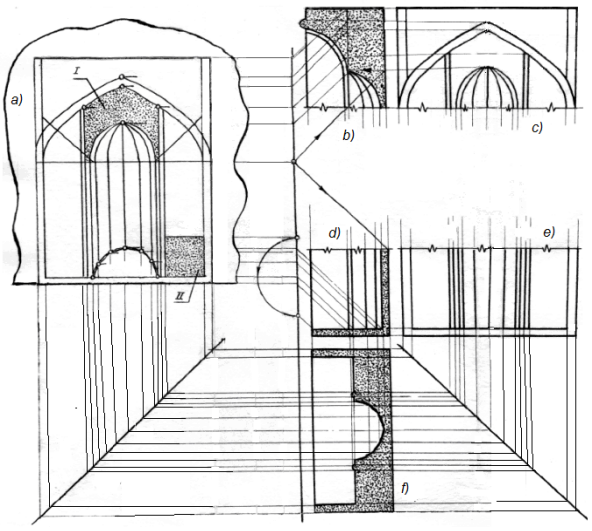

Figure 6. The mihrab is made by master Shirin Muradov with curved corners replacing frontal isometries with fragments of orthogonal projections

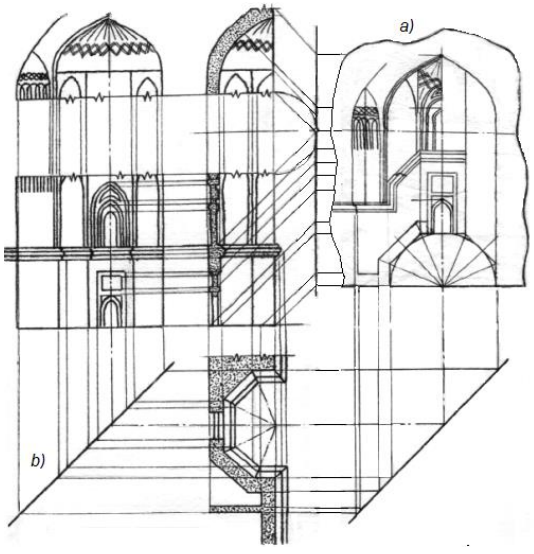

Figure 7. The master of the mihrab Shirin Muradov made a curve angled frontal isometries to orthogonal projections replace.

If we look at these drawings based on the scientific concept of oblique frontal isometries, we will get unexpected results. After all, both of these drawings are oblique frontal isometries of the respective objects. only, each of them consists of two oblique frontal isometries of the same object. In particular, these drawings have a line similar to the **horizon line** used in perspective drawings. What could be the function of this line?

The answer to such a question can be found in the opinion of one of the well-known orientalists: "Specific features of the oriental miniature... objects located at different distances from the observer are simply projected vertically: the near ones are down, the far ones are up, the size of the distant ones is not reduced proportionally" [5, kn.2, p. 247]. the last point can be understood as a reference to parallel projections, in particular parallel perspective (axonometry). only here, if the phrase "the near ones are down, the far ones are up" is clarified in the following way: "the near objects below the horizon line are depicted below, the distant ones are above ... and vice versa, the near objects above the horizon line are depicted above, and the distant ones are depicted below", everyonethings become clear.

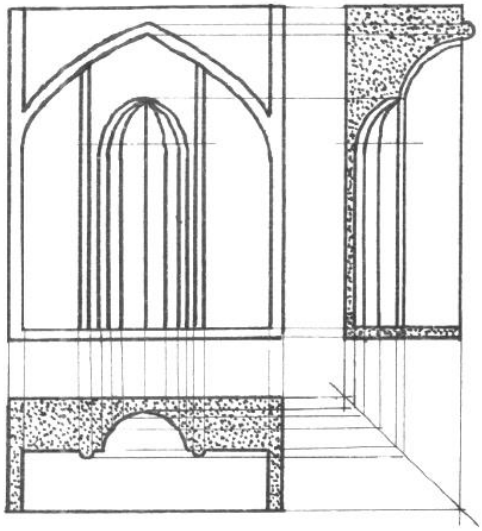

Figure 8. Altar drawing.

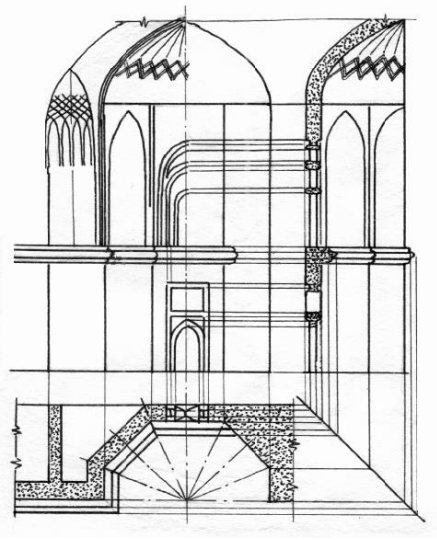

Figure 9. Interior drawing.

In Figure 6, based on this idea, the mehrob drawing by master Shirin Murodov's pen is considered as two oblique isometrics made for the parts of the object below the "horizon line" and above the "horizon line", and accordingly, it consists of three main views. in the form of a drawingis presented (Fig. 8).If we apply all of these ideas to the interior drawing drawn by master Shirin Murodov in Figure 7, we will get the same excellent results as before (Figures 8 and 9)

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