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ATTEMPTS TO TEACH THE RULES FOR BUILDING IMAGES PROJECTIONS

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Abstract. A drawing is an image that allows you to restore the true shape and size of objects in the real world, drawn on a plane according to certain laws that are the apparatus of descriptive geometry. In the drawing, all sorts of issues related to the clay of buildings, ishoots and machines are solved. In this case, the creations performed on the drawing plane correspond to the corresponding apertures in space. Therefore, studying this subject develops a person's ability to visualize various objects.
Keywords: Drawing geometry, plane, image, drawing, buildings, work, design, space.

The main task of descriptive geometry is to teach the theory of representing three-dimensional spatial objects on a plane (on a two-dimensional surface). Before creating construction drawings and technical forms, one of their models - a drawing - is made. Thus, technical ideas are clearly, simply, and quickly transmitted and received through a drawing.

If there is a “drawing – technique language” that is understandable to all nations, (G.Monge), drawing geometry is his “grammar” (V.I. Kurdyumov)

Attempts to teach the rules for constructing images served as the beginning of the creation of the method of projections.

Many works on imaging techniques were created during the Renaissance.

The book on perspective written by the Italian scientist and architect Leon Battista Alberti (1404-1472) in 1446 was published in 1511. The Laws of Perspective ("Trattato della pittura") were formulated by the Italian scientist, artist, and engineer Leonardo da Vinci (1452-1519). The 1525 work of the German painter and engraver Albrecht Dürer (1471-1528) is devoted to the study of the laws of perspective. This work uses the method of orthogonal projection onto vertical and horizontal planes. The Italian scientist Guido Ubaldi (1545-1607) provided a mathematical interpretation of the solution to almost all the main problems of perspective in his work "Six Books on Perspective". The basics of finding their true dimensions in terms of the perspective image of objects are also given by G. Ubaldi has since. The French mathematician and architect Girard Desargues (1593–1662) described the coordinate method of perspective in his 1636 work on perspective.

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Due to the distortion of linear and angular dimensions in perspective and isometric images (Parallel perspective), builders, sailors, and military engineers were unable to meet their requirements. Therefore, the need for other, more perfect methods of projection began to be felt. As a result, descriptive geometry was supplemented by two more sections, and consisted mainly of four sections: orthogonal projections, projections given by numbers, axionometric projections, and perspective.

By this time, projection methods with many networks were not unified under a common theory and existed in a scattered manner.

The French scientist Gaspard Monge (1746-1818) created the work "Geometrie descriptive" (Descriptive Geometry), published in 1799, which put all descriptive methods into a scientific system based on a priority theory. This work began to be taught as a textbook in French higher technical schools. Thus, the subject of "Descriptive Geometry" was first established.

Drawing geometry spread to other European countries as a subject of study and entered Russia in the early 19th century. In 1810, the teaching of descriptive geometry was introduced at the Railway Corps of the St. Petersburg Institute (now the St. Petersburg Institute of Railway Transport Engineers), and classes were taught by G.Monj's students, Farb and Potye, conducted the work in French. In 1818, Yakov Aleksandrovich Sevostiyanov, a graduate of this institute and later the first Russian professor, began giving lectures in Russian. In 1821, he published the textbook "Fundamentals of Descriptive Geometry" in Russian.

The textbook "Course in Descriptive Geometry" in the Uzbek language was published in 1967 by the first Uzbek professor in Central Asia and Kazakhstan, Rahim Khorunov, and was published four times. R.Khorunov worked at the Tashkent Institute of railway transport engineers from 1938 to 1992. The development of drawing geometry in Uzbekistan was developed by professors Sh.K.Murodov, A.A.Akbarov, R.Q.Ismatullaev, Doctor of Technical Sciences, Professor D.F.The Kochkarovs made a significant contribution.

Let the center of S-projections in space, the plane of projections P0, and the points A, B, C, D, E be given.

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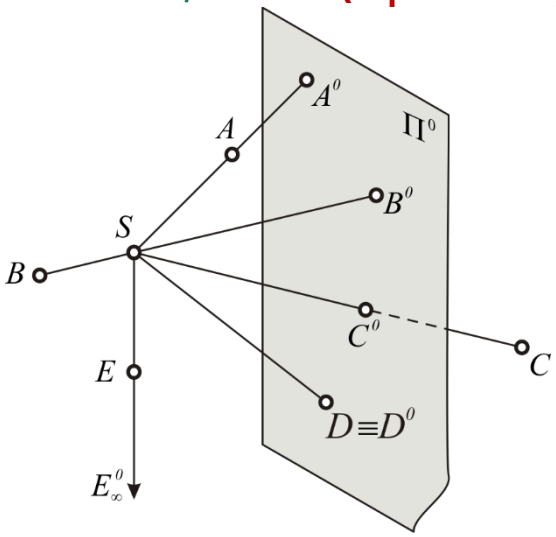

(Figure 4)

Projections of the points To find them, the intersection points of the lines connecting them to the center of projection S (projecting) with the projection plane Π0 are constructed. Since the line SE is parallel to the plane P0, the projection of point E - E0∞ - will be located at infinity. To construct the projection of a straight line segment, it is enough to connect the projections of the segment ends.

To construct the projection of a curve, the projections of its points are connected.

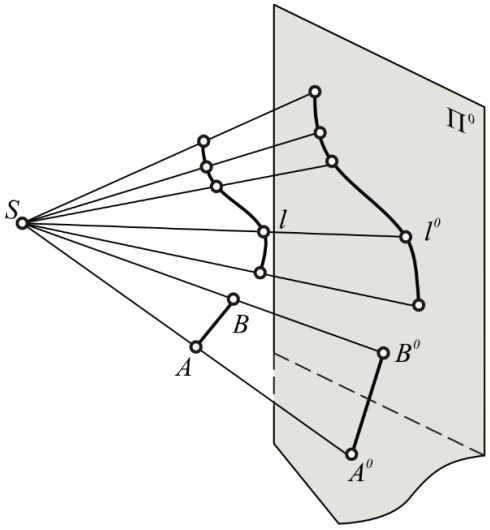

Figure 5

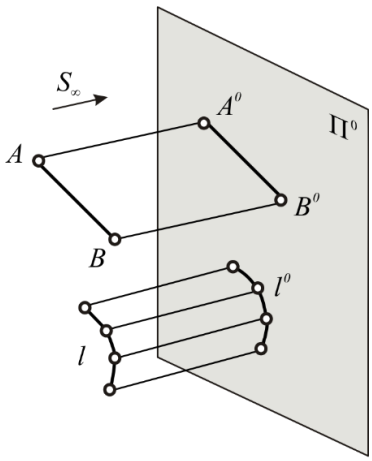

Figure 6

In this case, a set of projecting lines forms a conical surface. Therefore, central projections are also called conical projections.

An example of Central projections can be obtained from artificial lighting sources (candles, light bulbs) shades that fall on the floor, walls of their things.

If we assume that the center of projection S is infinitely far away in a certain direction S∞, then all the projecting rays will remain parallel to the direction S∞ (Figure 6). An

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example of this is the rays of light from the sun and the moon. To create a parallel projection of a line, the projections of its points are found and connected.

Since the set of projecting lines here forms a cylindrical surface, parallel projections are also called "cylindrical projections".

Parallel projections are divided into oblique and orthogonal (orthogonal) projections. In the first case, the projecting rays form an angle with the projection plane that is less than 90˚; in the second case, the projecting rays are perpendicular to the projection plane.

Despite the fact that Parallel projections are conditional (because the Observer is not infinitely far from the projection plane), due to its property of preserving real dimension ratios and the simplicity of the constructions, orthogonal, axonometric and remains the main way to generate images in numerically defined projections.

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