

Architectural Graphics - From Inception to Postmodernism

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Abstract: The article is devoted to the little-studied component of architectural creativity - architectural graphics. At the same time, the purpose of the article is three-dimensional: to consider the categorical, historical and postmodern problems of architectural graphics, which will allow to outline a holistic picture of this cultural phenomenon. The article uses the methods of typological, historical and synchronous-cult analysis of both specific architectural artifacts and trends in the development of architectural graphics in general. It has been proven that architectural graphics, as a unique type of graphics, are a means of expressing the creative ideas of an architect. They define, define and correct the direction of his professional searches. Graphics influence the creativity of a design as it serves as a graphical visualization of an architecture. Architectural graphics are the line between the design calculation and the creative imagination of the author. He performs artistic and engineering tasks at the same time. The article deals with the problem of architectural graphics as a specific creative activity, which, as a result of historical development, has formed into a separate genre direction. A number of conceptual and terminological issues are touched upon, including the definition of the very concept of «architectural graphics». The priority features of architectural graphics and variants of its stylistic solutions by different architects and designers have been identified.

Keywords: *architecture, graphics, architectural drawing, art, postmodernity.*

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Introduction

Until now, architectural graphics have been considered technical tools with which space is depicted and solve design problems are solved: compositional construction, recreation of building components. Most commonly, architectural graphics are treated as a means of fixing the idea of the project, although it embodies the features of art, a variety of which it is, and, at the same time, features of engineering and design activity. This is evidenced by a variety of patterns, both historical, which reflect the development of this type of architectural creativity, and modern, which correspond to the trends of the current moment.

Architectural graphics have been the subject of scientific consideration since the 60s of the XX-th century. The development of methods and techniques of architectural graphics is devoted the publications of Soviet scientist of the late 60s-80s: B. Barkhin, «Methods of Architectural Design» (Barkhin, 1987), K. Zaitsev, «Graphics and Architectural Creativity» (Zaitsev, 1979), G. Baranovsky «The Language of Architectural Graphics» (Baranovsky, 1986), which focused mainly on the practical aspects of design and the role of drawing in this process.

In the late 90s, a number of publications devoted to architectural drawing appeared, in which the main issues were professional knowledge of drawing techniques, its specifics in the field of architecture and its place in the context of understanding plastic culture as a whole. These are the works of O. Maximov «Drawing in the profession of an architect» (Maximov, 1999. p. 389), A. Ermolaev, T. Shuliki, M.Sokolova «Fundamentals of the plastic culture of an architect-designer» (Ermolaev, Shuliki & Sokolova, 2005), K. Kudryashov (2006) «Architectural Graphics» (Kudryashov, 2006), O. Osmolovskaya, A. Musatova «Drawing on representation in theory and exercises: from geometry to architecture» (Osmolovskaya & Musatova, 2012), G. Petrishin, M. Obidnyak «Architectural Graphics» (Petrishin & Obidnyak, 2009.). For the most part, the authors of these works turned to architectural graphics for their use in the educational process.

Certain issues of the development of professional drawing are reflected in works devoted to various aspects of style in architecture. This question, which is invariably relevant for architecture, was also considered in the aspect of teaching methods. The request for the study of specific means and methods of architectural objects submission that are used in the design led to the appearance of such publications as «Facade Washing» T. Kiseleva, N. Stasyuk (Kiseleva & Stasyuk, 2010), «Project Graphics» T. Klimenyuk, N. Consulova, M. Bevz, H. Kovalchuk (Klimenyuk, Consulova, Bevz, &

Kovalchuk, 2009), «Fundamentals of Professional Communications. Graphic tools: educational aid» by E. Generalova (Generalova, 2014). Among these publications were translations, such as «Architectural Graphics» Chin, D.K. Francis (Chin & Francis, 2007). Architectural composition as the basics of architectural drawing are in the tutorials by N. Lee (Lee, 2007), O. Maximov (Maximov, 1999) etc (Library of author's abstracts and dissertations on pedagogy, 2006.).

An analysis of the listed works shows that the information collected in them gives quite a broad idea of the problem of architectural graphics, although somewhat one-sided: architectural graphics are presented as a technical tool, academic discipline, and professional skill that an architect should possess. At the same time, architectural graphics as a separate type of artwork, the direction of professional creative practice, which have its own history, evolution, during which it was defined as a separate genre and has development prospects, have not been studied. The indicated aspects, which require their modern study, are considered in this article. Therefore, the purpose of this article is to examine architectural graphics in historical and categorical terms from the height of a postmodern critical approach.

Wherein priority issue in the article is definition of fundamental concepts. In this study, these are «architectural graphics».

Architecture and architectural graphics from the point of view of postmodern Philosophy

Modern technical means, computer technologies have opened up many new opportunities for the architect. Having significantly simplified the work on architectural graphics, the computer practically saved the architect from the need to make sketches and draw «by hand»: now a special program does it. The study of graphic computer programs currently provides freedom of creative action, and the lack of university education is no longer a problem, it is, in fact, not necessary. One of the postmodern contradictions arises - the competition between machine and man in the production of aesthetically valuable objects and artifacts, as well as related issues of perception and cultural assessment of postmodern man-made and digital architectural graphics (Nerubasska, Palshkov, & Maksymchuk, 2020; Nerubasska, & Maksymchuk, 2020).

However, despite the apparent identity of manual and computer graphics (Sivers, 2008), researchers record the interest of many modern architects in the original work «by hand», in a manual sketch. The return to it is explained by the fact that many architects see exclusivity in manual

graphics - that originality and uniqueness, which does not and cannot be in machine circulation work.

Really, in a «living» drawing there is a lot of active movement of feelings, spontaneity, where the meaning of the phrase «write vividly» conveys the origin of the idea, the spontaneity of the artistic idea, the free energy of the action, embodied in the image. In computer graphics, built on mathematical machine approaches, this feeling of life does not exist, the impression of artistry disappears, and architecture loses itself as an art. It is impossible not to agree with the opinion of the researcher of modern technologies in the architecture Maria Sivers (2008) that «if by handwriting it is possible to judge master's soul, his mood and worldview, then by the «handwriting» of the printer it is possible to judge only how «nervous» the computer is» (Sivers, 2008).

Revisionist approaches to the phenomenon of postmodernism in architecture allow us to trace its modernist origins from discursive perception to denial: «Revealing its narrow stylistic understanding as a result of a certain historical process, the thesis rethinks postmodernity as the spread of open transcultural discourses about modernity, regional and critical in architecture. This, in turn, allows him to reconstruct a wider range of postmodern problems, including his socially conscious aspects, which have gradually been muted» (Giamarelos, 2017).

Postmodern deconstructive criticism has led to the fact that practically oriented activities and art are considered proactive special cases of undifferentiated amorphous aesthetic and pragmatic concepts. However, such artifacts, like all reality, have several levels. In this context, architecture is technology and art, «influential and influencing» archaic and innovative, that is, ambivalent in any way (Abood, 2019). Architecture cannot as easily transcend modernity as, for example, literature or music, and cannot so easily be divorced from commerce, entrepreneurship, construction and other absolutely utilitarian industries. Against this background, hand-made architectural graphics in the context of postmodernism act as a challenge to the mass character, consumerism in favor of exclusivity, «handmade», etc.

Basic dissertation research of postmodernity in architecture is also characterized by its analysis as open transcultural discourses about modernity, in which the regional and global, aesthetic and technological still compete. Therefore, researchers conduct a kind of critical revision of the concept and ontology of postmodern architecture and graphics, while observing a decrease in socially conscious aspects of architecture and an increase in an unconscious mass quasi-aesthetic component (Giamarelos, 2017). Postmodern architecture inflicts the main «blow» on postmodernism

proper with its marginal dominance: it rejects the primacy of Western European / North American and promotes the aesthetics of the periphery, which gave rise to the phenomenon of critical regionalism in architecture in the early 1980s.

In general, an analysis of the publications of journals on postmodern architecture from the scientific-metric bases Scopus and Web of Sains indicates that scientists are wary of using the term «postmodern architecture» and research it even less. For example, A. Brennan summarizes in this regard: «Few historical studies have fulfilled the double task of writing the history of a significant architectural moment of postmodernism and at the same time revealing its defining theoretical concepts» (Brennan, 2018). One of the reasons for this, the scientist sees in particular the postmodernism of architecture as a space of revival and fusion of architectural styles, which can be metaphorically compared with postmodern intertextuality.

Authorship and postmodern authenticity, as a rule, are not considered together, as they are considered a contradiction. Modern architectural postmodern constructions of high cultural value can be studied from the point of view of perception (perception). Particularly interesting are the perceptual impressions of tourists - people who see these architectural objects for the first time. The parameters of this perception are often the relationship of «perceived authenticity, existential authenticity and loyalty», which can be represented and processed in the form of a model. Using the example of Chinese world heritage sites of the postmodern era, scholars Xiaoli Y., Xiaoxiao F., Larry Y., and Jiang L. (2018) have shown that in the perception of postmodern architecture, «the restraining role of postmodern authenticity in the relationship between perceived authenticity and existential authenticity has been articulated. The results showed that postmodern authenticity mitigates the impact of architectural heritage on existential authenticity: the higher the level of postmodern authenticity, the lower the effects» (Xiaoli, Xiaoxiao, Larry, & Liao, 2018). From this, we can conclude that the postmodern author's and perceptual aesthetics are congruent, but not identical, which allows us to speak rather about the loyalty of the perceiver, his own postmodern micro paradigm of each act of encounter with an architectural artifact. This fact should be taken into account when assessing the importance of manufacturability, authenticity and man-made postmodern architectural graphics, which will make it possible to predict its social, aesthetic and tourist effect after practical implementation.

As one of the most visual forms of art, postmodern architecture is characterized by ease of perception, free associations and urban motives.

«Visual conciseness and its interaction with time and pace in the process of changing attitudes during the evolution of modern architecture and romantic thoughts date back to the nineteenth century, showing the pinnacle of naturalistic architecture in architectural works. Visual brevity, without the slightest doubt, prioritized purpose, and the image of an architect (imaginary) developed in modern architecture» (Yuste-Golob, 2019). This once again confirms the thesis that in architecture «Postmodern symbolism arose from forgotten memories». Scientists now also talk about the phenomenon of «post-postmodern realism» in architecture, in which there is no unified aesthetics, but there is an indifferent attitude «towards a vague, meaningless world» (Yuste-Golob, 2019).

Finally, to determine the role and value of hand-made architectural graphics, it is necessary to understand how digital creativity has penetrated architectural postmodernism and vice versa. The so-called «digital turn» took place at the end of the twentieth century. And became both a tool and a precedent for the aesthetics of the end of the postmodern era. C. Mac Donald (2019) observes: «The philosophy of object-oriented ontology shapes aesthetic theory and our understanding of the inner life of things. The combination of these influences leads to a new consciousness of designers regarding the use of digital techniques. Instead of postmodern road signs and duck buildings, digital postmodernism uses digital aesthetics and techniques - neon gradients, aggregation, channels, pixels / voxels, and other digital «signs» (Mac Donald, 2019). In the context of the foregoing, real incarnations of «computer aesthetics» appeared in architecture. They are characterized by a sharp and immediate transition from the representation of an object to reality, while percipients in static forms «read a number», as well as encoded deep cultural meanings in details, which activates the subconscious mechanisms of a postmodernist oriented percipient. Scientists qualify this phenomenon as «the opportunity for architects and the public to unite in their quest to connect the parallel worlds of virtual and physical space» (Mac Donald, 2019).

Nonconformism as a key feature of postmodernism reveals itself in architecture by highlighting details «outside the plan», as well as by arranging «post-functionalist urban planning around the building» (Urban, 2020). This is especially noticeable in the architecture of post-socialist countries, which deliberately emphasized nonconformist ideas against the background of an authoritarian socialist regime, starting in the 1970s. The abrupt change of the socialist system to the capitalist one gave the architecture of such countries its own specificity: instead of irony and abundance in the architecture of Poland, the Czech Republic, Slovenia, buildings with national and patriotic

narratives appeared, with hints of a return to stable values, which in a sense is not part of the standard postmodern paradigm.

And finally, summarizing the legacy of postmodernism as a whole, it can be noted: firstly, in the 2020s. increased interest in architectural works of the 2nd half of the 20th century, especially in Eastern and Central Europe; Secondly, the countries of the post-Soviet space are belatedly developing a discourse about the postmodern heritage in the architecture and the cultural context that accompanied this process (Mankus, 2020). A separate study is required for the manifestation of postmodernism in the East Asian region, where it (postmodernism) has a very original manifestation, coupled with local traditions.

Basic definitions and concepts of architectural graphics

The most general definition of «architectural graphics» is the maxim that it is a combination of graphic means (line, stroke, spot, dot, tone, chiaroscuro), with which the architectural object is depicted. With such a representation of architectural graphics, for example, the first stage of teaching architectural skills begins, which includes acquaintance with an architectural figure, an architectural sketch, and an architectural drawing. The main specific feature of architectural graphics is the use of two image methods - *drawing and figure*. Their combination helps to improve the quality of design of the selected architectural solution and its implementation in reality.

Architectural figure- this is an image that conveys information about the size, shape, structure of an object, as well as criteria formed on the basis of the laws of descriptive geometry. The figure is used at all stages of the design work (sketch, measurement, outline, working, demonstration figure).

Architectural drawing, in accordance with the definitions in the scientific and methodological manuals, any drawn work, the plot of which may have independent significance (a sketch from nature, graphic illustration, etc.) should be considered. In turn, a pattern is defined as an image, «handwriting, as well as in a figurative sense, as a linear structure, as a surface texture (drawing of spots in a painting, stone drawing) and even as a trajectory of movement (dance drawing)» (Zorin, 1990). Such a definition does not differentiate the drawing either on the basis of purpose or on professionalism of performance. In this case, the term «drawing» also refers to drawings by Raphael and P. Picasso, which are works of high art, drawings by Le Corbusier, the professional quality of which is clear to architects, technical drafts of the engineer, bearing practical explanatory characteristics, and even the child's scribbles, interesting for a kindergartener and a teacher.

Drawing is a broad concept, where not every image can be attributed to the field of art. To art are those that meet the requirements of graphics as a kind of fine art (Zorin, 1990). Such an **image is classified as a fine art** - graphics, which are mainly created by hand in a single copy and refers to easel graphics. In this case, drawing is a separate artwork, graphic sheet, an art-graphic image made by the artist manually on a plane (paper or cardboard) with graphic materials (pencil, ink, charcoal, pen, etc.). Such a drawing reflects the real world, «operating» with the same means as any other drawing with its characteristic features: proportions, volume, texture, shape, plane of the sheet. The variety of the drawing is achieved using different techniques of graphic means, the features and combination of which allow you to create images, ranging from planar linear to plastically modeled tonal and black and white gradations. The nature and quality of the picture is determined by the simplicity and speed of execution, the laconicism of the technique and the fluency in the technology of its creation.

A drawing can be one of the stages of creating a work of art or a design object. It can also exist on its own. Thus, a drawing can be both an object of creative practice, a means of artistic activity (performed for oneself or for the viewer) and their purpose.

In terms of *academic discipline*, drawing also acts as a means of learning and the artist's understanding of reality, which is a part of the teaching of drawing, including drawing from nature. Such training is compulsory for easel artists and monumentalists, as well as sculptors, as accurate, confident, competent drawing is the basis of the picture. At the Academies of Arts, Art Schools, drawing is the basis of education: it is called the «educational drawing».

The above shows that «architectural graphics» and «architectural drawing» are not synonyms. These two concepts carry different semantic load, which can be explained by referring to the origins of the architectural graphics formation, that is, the history of the issue. So, a unique literary monument of the X-th century, which is associated with the name of the monk Khrabr, led researchers to the conclusion about the difference between «features» and «cuts» in the designation of lines (Cherkesova, 2015; Sidorov, 1956; Ukrainian-Russian dictionary, 1977). According to scientists, the sequence of formation of the studied concepts is as follows: **res - res - drawings - dash - dash - drawing and Polish - rysunek; grapho - graphs - isograph - graph – graphics** (Cherkesova, 2015). Moreover, the term «graphics», which comes from the Greek grapho (write, draw), is much older than the term «drawing», «draw» (Sidorov, 1956). Mentioned in «Slavonic Dictionary» of the Pavma Berinda expression: **начертываю** –

Рисую» (nachertuvay – rusuy) the famous researcher A. Sidorov associated with Ukraine, believing that the Ukrainian-Polish word «rysunek» is the first Slavic designation of this art form (Ukrainian-Russian dictionary, 1977). With various definitions of the term «drawing», which belonged to such authors as A. Barshch, N. Beda, A. Rostovtsev etc, common to all - was that it was attributed to the main means of expression and technical methods, although they have their own characteristics in architectural graphics: for example, dot and color play a lesser role here than in the book, easel, illustrative graphics. This is precisely the artistic phenomenon of «drawing», where a linear drawing is created by hand, without the use of drawing accessories - a ruler, drawing pen, compass, moreover, the line is one of its fundamental means (Barshch, 1970; Beda, 1981; Rostovtsev, 1981; Sidorov, 1956).

It is noteworthy that the term «line» comes from the Latin *linea* – «thread». A line is an expressive means of plastic arts, a functional element of the organization of composition, the limit between form and plane, an auxiliary tool in building perspectives (Cherkesova, 2015, p. 92). It is applied on paper with graphite pencil, pen and ink, and on other materials that are used in easel graphics - with a stylus, etching needle, etc. (Cherkesova, 2015, p. 92). Graphics as art, including an artistically executed drawing, also provides, in addition to the line of hatching, which can be seen in printed images - engraving, lithographs, which are based on such a drawing (Ermakov, 2004; Stroyk, 1990). Some researchers refer to artistic and schematic images made according to the laws of composition, such as, for example, the technical sketches of Leonardo da Vinci from the Atlantic Codex (Zorin, 1990).

In this context, architectural graphics demonstrate the completeness and variety of technical and artistic types of architectural images, which leads to different levels of communicative complexity of perceiving the information embedded in them (Kudryashov, 2006). At the same time, a number of researchers believe that technical, auxiliary design sketches and drafts, which are types of architectural drawing, correspond to its applied purpose, and artistic drawings - natural and architectural fantasies that emphasize the architectural features of an object - should be referred to as «architect's drawings» (Zaitsev, 1979; Zorin, 1990). There is also an opinion that only images combining elements of a figure and a drawing, which significantly enhances their information content, should be referred to as «architectural graphics» (Zaitsev, 1979). Such systematization allows us to distinguish various functions of this type of image: in the first case, it is a means of fixing architectural thought and monitoring the design process; in

the second, the creation of an artistic image of the object; in the third - an objective and visual transmission of the spatial nature of the structure (Zorin, 1990) Thus, architectural graphics can be considered as a means of professional communication and control over project work; constructive and spatial analysis; compositional and figurative-artistic analysis; synthesis of arts; communication with related areas of artistic activity, which confirms the variety of tasks of graphic activity and, at the same time, the multifunctionality of the program of graphic architecture as a whole.

The completeness of the concept of architectural graphics is largely determined by its historical evolution from origin to formation, establishing, evolution, which demonstrates the stages of development, dynamics and quality of changes.

Architectural graphics through the prism of history

The history of art considers architectural graphics through understanding the art of drawing, its features in certain periods, such as drawing from the Middle Ages, drawing schools, such as the Raphael School or the School of Mannerists, its specificity in the work of individual artists, such as Leonardo's da Vinci drawing, Holbein's drawing, Van Gogh's drawing. So, thanks to Architectural and Art History sources it is established that the concept of «architectural graphics» arose only at the end of the XVIII-th - beginning of the XIX-th centuries. Drawings, sketches, and figures at academic architectural institutions began to be generally called «architectural graphics», in contrast to art academies, where sketches, drafts and drawings were referred to graphics (Bugueva, 2015). Initially, when students-architects took a technical education program in engineering and fortification, practically no attention was paid to artistic and aesthetic education. Over time, in the XIX-th century in academic institutions revealed the need for special artistic and aesthetic education of student-architects. A drawing, which from ancient times still created Paleolithic cave paintings in the form of lines and spots, outlined and scratched with sharp fragments of stones, charcoal, dry clay, was first evaluated as an important form of creative practice.

It is also significant that most modern scholars do not have a unified point of view on how long ago the architect began to use the drawing image of architecture. Neither the historical antiquities of Ancient Egypt, nor ancient Greece, nor Mesopotamia preserved the samples of drawing architecture images in mass form, as they should have reached our time. Experts agree that the architects who built the architectural structures in the

era of ancient civilizations did it without architecture drawing. Perhaps they used volume models instead of drawings. At the same time, isolated samples of the ancient architectural drawing still exist. This, for example, the Babylonian map - a drawing made on clay tiles, which dates back to the period 2500 years BC. A drawing diagram of the underground part of the pharaoh Hofra burial of the XXVI dynasty, buried in 567 is also known; Drawings of architectural details and fragments in full size exist in the ancient architectural complex with the temple of the Greek God Apollo in Didim, where they are carved on a stone surface. In addition, the works of a Roman architect, military and civil engineer Vitruvius, who lived in the 1st century BC. mention a complex set of drawings and huge models that were made by special craftsmen according to the instructions and drawings of architects. A peculiar example of his work is the plan of Rome in the era of Septimius Severus with the contours of squares, streets and buildings, carved on the plane of the marble slab «Forma Urbis Romae» (203-211) and fixed on the inner wall of the temple of Peace, which is now the outer wall of the Basilica Cosmas and Damian. The plan, which originally had a width of 18 m and a height of 13 m, on a scale of 1: 240, indicated the location, contours and names of temples, public and residential buildings in the central part of the city. Researchers believe that the plan was copied from the original drawings (Moatti, 2001). Similar drawings continued to be created in the Middle Ages, they are preserved, for example, on stone slabs in the cathedrals of Limoges, Narbonne and Clermont in France.

In the Middle Ages, the practice of architectural drawing and architectural graphics went through a significant stage in its development. The witness to this is the well-known illustrations of the XIII-th century manuscript diary, authored by an architect from Picardy Villar de Onnecourt (1195-1226). The album reflects the period when ideas traveled with the masters and were considered the common property. They are images of buildings and construction devices. The album contains sketches: the tower Notre Dame Cathedral in Lann, a side wall with windows Reims Cathedral, samples of Gothic rose-windows in Chartres and Lausanne and the like. Medieval architectural graphics were performed on wax-diptych wooden planks, as in the Late Antiquity. A recess was made in two boards, waxed surfaces were laid on top of each other, boards were tied to avoid deformation of the picture and inscriptions. In Onnecour's time, architects used stone, parchment and paper for drawings. The album of Villars de Onnekur (1965) of the Gothic era proves that at that time there was already a need to store building knowledge, including architectural drawings. Drawings of Strasbourg Cathedral on large sheets of parchment are known.

Onnekur's album is also made on parchment, with pages of 14×22 centimeters. It has come incomplete on sixty sheets and was originally, according to experts, significantly more. According to the researchers, Villard de Onnekur (1965) began to create it during his studies and travels, introducing information about architectural samples, patterns of theoretical projects and plans, drawings of Gothic sculptures, engineering mechanisms that were used in construction. According to such drawings, pillars-supports, Gothic windows were made; stones were cut for the necessary profiles. After his death, the album served for learning, i.e., used as a textbook. Judging by the annexes to the album, many architects, using it, actively mastered the drawing of buildings, construction devices and mechanisms (Villars de Onnekur, 1965).

Architectural graphics of Villar de Onnekur (1965) resembles a modern technical illustration, a technical sketch. In this regard, a sheet with a drawing of a nonexistent exemplary choir of the Gothic church, where the external buttresses, pillars, crown of chapels, rib arch are marked, is quite interesting.

It is possible that at all stages of activity medieval architects knew and used «drawings», the preparation for which was generalized graphic schemes, called «sketches» in our time, which also confirms the availability of tools and materials of that time - various compasses, rulers, squares, measuring cords, which were primitive tape measures, sets of drawing pens of special size and sharpening, made from plumage of sparrows, geese, eagles. The material for such sketches could be paper (parchment) or thin skin, which, as it is known, is poorly preserved.

Paper distribution in Europe in the XV-th century contributed to the development of graphic art - drawing, engraving, book illustration. At the end of the XV-th century images of various mechanisms and devices related to the improvement of settlements and their protection appeared. A vivid example is the drawings of Leonardo da Vinci (1452-1519), who owns a number of engineering and architectural ideas, including the architectural development of a new type of a city plan. The project, created in 1483-1485 was relevant due to the plague that erupted in Milan, which took many lives (Mikhailov, 1952; Favorsky, 1986). Leonardo's drawings combined sketchy picturesque and engineering plans with precise calculations.

At the turn of the XV-th century obtaining a high-quality architectural drawing-figure, required the architect to review the entire image system. Drawings that represented the construction in volumetric schematic images, with views scaled down using a scale ruler, with architectural objects created using length measures appeared. In «Treatise on Architecture»

(Trattato di architectura) 1465, its author, theorist of architecture Antonio Averlino (Filarete, 1999), in a dialogical form, talked about invented by him perfect city Sforzind. Connected to the outside world through a system of channels, the city of Averlino seemed surrounded by a powerful fortress wall in the form of a star of regular shape, which was significantly different from the chaotic medieval buildings. The towers at the tops of each of the eight rays of this star combined avenues coming out of the center. In the center of Sforzind was the main square with the cathedral (Palladio, 1936). The trend of the time was the depiction of cities, buildings and localities in the «new style» of the drawing, which was often combined with traditional medieval decorativeness, colorful lighting of a clean range and geometric shapes built according to the rules of orthogonal design. The creation of images of architecture developed within the framework of the landscape, veduta, architectural graphics, in which A. Durer and J. Colbert tried their hand, which led to the emergence of new art forms.

In such conditions, the rules of architectural graphics were gradually formed, which were looking for the opportunity to show conditional images of accurate images of buildings. Such tasks were affirmed thanks to the appearance of print publications on architecture. For example, the publication of A. Palladio «Four Books on Architecture» marked the formation of architectural graphics as a system and design rules based on the scientific mapping of the environment (Palladio, 1936). The development and formation of European architectural graphics of the XVI-th century consisted in transferring the image from the construction site in the form of a drawing in a reduced size to paper.

Interest in architectural drawing attracted many great architects in the Renaissance. They were engaged in improving the methods of projection drawing in orthogonal projection and in the perspective. After Leon Battista Alberti, Piero della Francesca, Leonardo da Vinci, Albrecht Durer, Guido Ubbaldi, the drawings became more concise and accurate, the project began to include compulsory orthogonal images of the plan and sections of the building, architectural details, master plan (Bugaeva, 2015; Mikhailov, 1952; Starkova, n.d).

Since the beginning of the XVI-th century architectural graphics relied on geometry as scientific knowledge, were widely used in building perspectives in the image of buildings (Bugaeva, 2015). Its further development took place in accordance with the establishment of scientifically based schematization and artistic understanding of visualization. The main tool was the introduction of scientific knowledge in constructing the meaningful expressiveness of architecture, which was captured by the

leading art styles of the New Age - Mannerism, Baroque, Classicism. The works of architects relied on the study of mathematical laws: the use of the coordinate system of R. Decart (1596-1650) in the architectural plans of G. Gvarini (1624-1683) and A. Pozzo (1642-1709), images of architecture on the plane through the projection of J. Piranesi (1720-1778), B. Wittone (1702-1770), K. Ledoux (1736-1806). These innovations accelerated the development of new methods of constructing complex architectural forms using architectural graphics, which had already from the beginning of the XIX-th century led to a revision of the visual language of art, and at the same time to architecture based on mathematics. Mathematics has forever become a scientific discipline, obligatory for professional activities and artistic understanding of the architect's work (Bugaeva, 2015; Stroyk, 1990).

Academic art raised architectural graphics to such heights that the masters of this field treated it as a kind of art. As a result, a new genre of fine art - architectural fantasy appeared. Even in the first half of the XV-th century, its supporters were Filippo Brunelleschi and Leon Baptiste Alberti, the pioneers of new European architecture. In the XVII-th century their ideas were developed by the Viennese architect Bernhard Fischer (1656-1723), and in the XVIII-th century by the Roman architect Giovanni Batista Piranesi (1720-1778) (Bugaeva, 2015; Stroyk, 1990).

Drawings of buildings and their details began to be depicted in orthogonal projections, partly in the perspective, although the methods of such images remained of not quite a high quality. In a number of European countries, the drawings were long limited to a scale-free plan with dimensions stamped on it. In Russia, for example, the creation of scale drawings was introduced only under Peter I, but by the middle of the XVIII-th century. Russian architects such as M. Zemtsov, F. Argunov had already demonstrated full-fledged facade drawings, plans and general views.

Finally, the concept of «architectural graphics» was formed in the late XVIII-th - early XIX-th century. Since the beginning of the XIX-th century mathematics became a basic source for the further development of architecture and art. As a compulsory discipline in art and architectural institutions, mathematics served as their professional creative activity (Bugaeva, 2015; Stroyk, 1990).

From the XIX-th century, architectural graphics began to acquire a specific style. It was formed from linear graphics techniques with filling, hatching, the use of orthogonal projection (Monge theory) and the introduction of drawing instruments: dual drawing pens, elongated compasses. The Academy of Architecture and Art had a great influence on the nature of architectural graphics: the Academy in Florence created in

1562 by the Roman Academy of St. Luke, the Academy in Paris (1648), the Russian Academy of Three Noble Arts (1757). In their walls, for architectural graphics, techniques for ink washing, drawing, linear and line drawing with a pen, lead pencil, and much more were developed and implemented (Types of architectural graphics, 2016). Their graduates, representatives of European Art Nouveau - K. Ton, G. Sherwood, V. Valkot, S. Malyutin, R. Klein, A. Schusev, F. Shekhtel, L. Kekushev, I. Kuznetsov, in the second half of XIX-th - early XX-th century significantly enriched and complemented the architectural drawing with stylish, expressive and vivid graphics.

Creative ideas of the late XIX-th century determined the flourishing of graphics. The high level of academic presentation of the image, which was practiced at architectural and art academies and schools, gave impetus to the improvement of methods for transmitting three-dimensional space, various techniques of architectural drawing, improvement of sketching and drafts, watercolor washing. In different countries, leading architects, whose activities demonstrated the synthetic nature of the architects' creative work, such as A. Schusev, F. Shekhtel, A. Wagner, A. Loos, not only organically combined different types of plastic arts in a single architectural work, but were able to represent them worthily, appreciating the artistic merits of the graphic presentation (Dudtsev, 2011).

In the first quarter of the XX-th century, a new phenomenon was the appearance in Europe of architectural design schools. Innovative ideas, a unique methodology, and a productive teaching methodology of the Bauhaus school in Germany, which began its work in 1919, and High Artistic and Technical Workshops in the Soviet Union, which started in 1920, became leaders not only in the field of urban planning and design, but also in architectural graphics (Koinova, 2011). Professional teachers and masters of these schools are V. Gropius, H. Mayer, M. Nad, J. Alberta, N. Ladovsky, I. Golosov, V. Vesnin and A. Vesnin, M. Ginzburg, K. Melnikov, I. Leonidov, V. Kandinsky introduced new views, concepts and developments into the architectural graphics of the XX-th century, expanded the scope of its applications. Resources such as fixing objects from a bird's eye view, expanding survey points and types of images, and a variety of perspective angles were introduced into the project schedule; as new techniques, concise, clear dash and line graphics, a collage, airbrushing, the use of tempera, gouache, etc. were used (Types of architectural graphics, 2016). Architectural Graphics of the 10-20 years of the XX-th century, not only turned to revolutionary methods in working with forms in the field of

cubofuturism, suprematism, constructivism, but also brought a lot of new to the avant-garde plastic culture.

One of the best representatives of this period was the Soviet architect Ivan Leonidov. The architectural graphics of I. Leonidov represented the transition from a laconic «architectural suprematism» to a multidimensional architectural and artistic synthesis. The synthesis of the expression means that he used almost reached color and «spatial» polyphony (Gozak, 2002). It, according to eyewitnesses, Le Corbusier praised at one of the meetings with Moscow architects. He compared the architectural flair of I. Leonidov with absolute ear for music (Lezhava, 2019). The design graphics of I. Leonidov were presented in a variety of forms - from «live» pencil sketches to drawing graphics with elements of drawing and painting, appliques, project-paintings, made in the old Russian «icon-painting» technique. In his author's graphics, Leonidov, along with the traditional white background, used a black background for projections, in which he achieved the effect of depth.

In the practice of architects of the XX-th century, an architectural sketch reached the level of independent work. It acquired its own style and writing, diversified with metaphors, associations, conceptual designs. Along with artistic qualities, the sketch acquired an intellectual level associated with the theoretical modeling of the work, which is confirmed by G. Meyer's analytical architectural drawing; tables of copyright classifications of M. Fuchsas; sequential diagrams of semantic and morphological volumetric-spatial transformations of the projected volume by P. Eisenman, who combined graphics and prototyping.

In the XX-th century a significant impact on the formation of methods and techniques of architectural graphics had the reproduction of plastic in its organic analogies of S. Calatrava's projects; the «watercolor» method in creating the architectural light-spatial environment of S. Hall; shape-forming impulses in the drawings of E. Moos; game presentations of V. Alsop's projects; minimalism of architectural graphics A. Siza; emotional images of M. Fuchsas.

Conclusions

Based on the foregoing, it can be argued that the phenomenon of «manual» architectural graphics in today's technocratic time is an urgent problem, and manual architectural graphics with its individual, exclusive qualities are valuable for specialists as a facet of art and engineering, a kind of professional «luxury». The position of a specialist who thinks that for

«graphics needs graphics, but computer graphics needs a computer» (Starkova, n.d), is largely determined by the historically traditional view of the master-architect, who does not want to lose his personality. Study of architectural graphics as an independent creative practice and genre direction allows to understand better the origins of inspiration and the human desire for beauty.

At the same time, postmodern architecture postulated intellectualism and proactivity as rather amorphous, but intuitively perceived tendencies at different levels of creative ontology. Moreover, intellectualism did not become an obstacle to the mass and pre-empowering assimilation of postmodern architecture and design.

Historically architectural graphics have been developed since the 15th century, although the first drawings of structures were known before. Initially, the task of architectural graphics, as evidenced by the treatises of medieval architects, was to transmit visual images of structures that mainly determined the vector of its development in the future. Architectural graphics were used in architectural design, where there was a need to solve two types of problems: 1) engineering, to identify design features, shape tectonics, proportional relationships of parts of the object; 2) artistic, in reflecting the perception of the architectural environment, the organization of space, monumentality, the scale of forms.

Different types of architectural graphics were used: a) drawings to identify architectural and structural features, b) sketches for developing a project idea, displaying possible forms of perception of the form, including in the form of three-dimensional images - axonometry, perspective views.

Modern architectural graphics is represented by classical (manual) and digital (computer) modifications. In classical architectural graphics, paper, pencil, rapidograph, ink, paints, brushes are used as tools; in digital - computer programs. Despite the widespread adoption of information technology, the dispute about the importance of manual technology in improving the personality of an architect who owns drawing and painting remains open. Despite the transition of architectural firms and design bureaus to computer graphics in design engineering, the value of a sketch design remains high. If a working drawing is necessary for the transmission of information, then a conceptual design, along with information content, is also a work of art. Manual graphics are more humanistic than computer graphics - technological, scaled, rational. Combining traditions and innovations in the architectural process, architectural graphics create an indivisible interweaving of ideas and forms that are an expression of a holistic concept of architecture.

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