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Perspective Drawing in the Architectural Design Process

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Abstract. The paper deals with the problems of the significance of a perspective drawing in the architectural design. The role of a perspective as a final presentation drawing in the project is not doubtful. Far more complex is its importance throughout the design process. At the beginning of this process perspective sketches become a graphic medium for design associations, a quick notation of ideas and a field of research for connections between the designed object and its surrounding. During such a process the perspective sketch checks the correctness of the spatial relations and helps modifying architecture. The recalling of pictorial notes from a project which was carried out for an architectural competition in Madrid serves as an illustration of the discussed problem. The several sketches show how the perspective drawing acts as a design tool as well as a mean of pictorial communication.

1 Perspective drawing as a project visualisation system

"Drawings may take many forms, but the graphic method of representation is a basic natural form of communication of ideas that is universal and timeless in character" (F.E. Giesecke et al. [3], p. 3).

The first descriptions of the graphic manner of a real object's visualisation can already be found in Arabic tracts as an "aspectibus". In ancient Greece the science of light propagation and object seeing also refers to this problem. The word perspective originates from the Latin word "perspicere" meaning to look at closely. Today (apart from other common meanings) by the word perspective we understand the visual aid of pictorial representation of the three-dimensional space in a plane. The perspective drawing is one kind of such representations.

Perspective drawing plays a different role during the design process. It is obvious that at the end of this process the perspective drawing is aimed to show the final design product to the client offeringan easy understanding of all spatial relations. It reveals the beauty

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of the building and its appearance in the landscape. The model of the building may have similar importance, but the perspective excels it because it approximates very closely the view obtained by the human eye[1]. On the other hand the disadvantage of perspective is the limited number of views possible to be drawn in the project. Today the computer techniques may help to overcome this problem. The 3D presentation system based on CAD and rendering programs allows the object to be viewed from practically limitless points of view. It is also possible to create computerized films pasted into a video, taken from the designed building's site. The most advanced technology that can be very helpful for architects is virtual reality. This opens new fields in the design process not only for architects; perhaps also the future user of the designed object can be involved into this process.

Whereas the role of the perspective drawing as a final presentation in the design process is clear, its importance as a creative factor in such a process is far more complex. The drawing itself can work as a medium through which the process can be influenced; it can serve as an analysis tool simultaneously helping to synthesize the multilevel researches on the designed object.

One may encounter different ways to create understandable projections for a pictorial representation of projects in the history of architectural design[2]. Universally accepted systems are based upon principles of geometrical projections. We may explain quite accurately our design by a series of exterior views (elevations and sections). This type of representation has limitations: The main one is that the user must be familiar with the principles of multiview projections. Perspective by its nature is too complex to become a tool for fast and errorless project presentation. On the other hand it is a perfect drawing for spatial understanding of plane projections[3]. Another drawing that shows several views of the building at once as they appear to the viewer is an axonometric projection. Depending on the number of scales of reduction, axonometric projections are divided into isometric projection, dimetric projection and trimetric projection.

The decision whether perspective or axonometric projections are used in the design procedure depends on architect's approach and on the project requirements. In many architectural designs it is obligatory to show perspective and axonometric views simultaneously.

In this paper we wish to present the most important phase of the design process. It is the architectural idea and how it is influenced by the perspective drawing. It is obvious that the evaluation of such an influence is arbitrary. Exactly as arbitrary is the conceptual thinking in the field of architecture. This, however leads to the best results man can achieve so far.

2 The perspective drawing and the project

Our example is based on an architectural competition for the extension and replanning of the Prado Museum in Madrid. The competition was announced by the Ministry of Culture of the Spanish Government, by the Royal Trusteeship of Prado, by UNESCO and the International

[1]This kind of perspective drawing is aimed to create the illusion of the real situation – similar to a photographic presentation. It is called *rendering*. The condition is correctness of presentation, since there is great possibility to adulterate the image what is difficult to spot particularly by an inexperienced eye.

[2]*"Perhaps the earliest known technical drawing in existence is the plan view for a design of a fortress drawn by the Chaldean engineer* GUDEA *and engraved upon a stone tablet which is a part of a statue now in the Louvre, in Paris and is classified in the earliest period of Chaldean art, about 4000 B.C."* ([3], p. 5).

[3]Prof. BARTEL distinguished several types of perspective drawings: Central linear projections (one point perspective, side perspective, oblique perspective, free perspective) and painting perspective (cf. [2], p. 217).

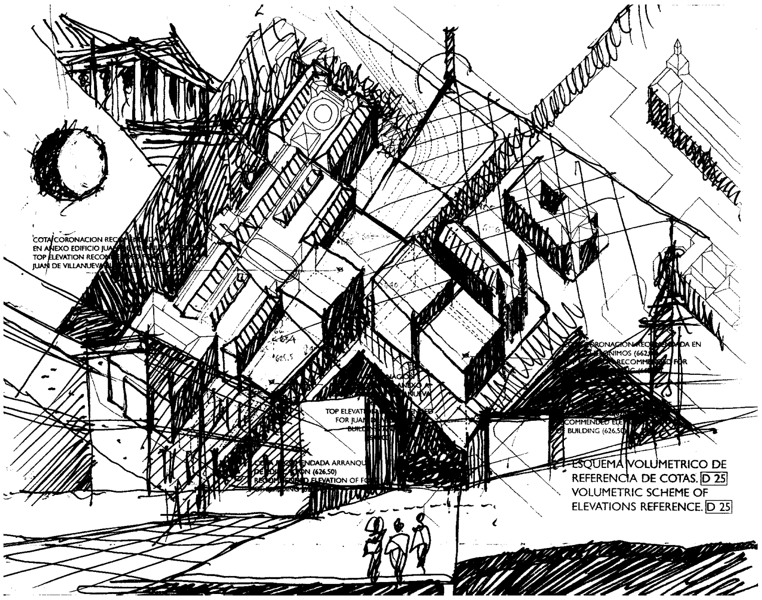

Figure 1:

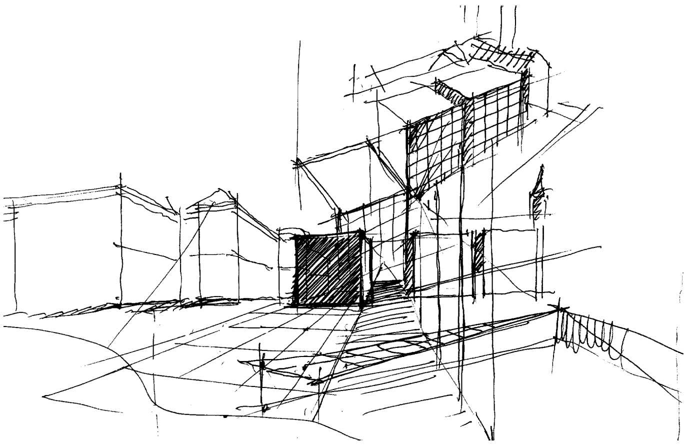

Figure 2:

Union of Architects in 1995. The aim of this competition was a new building, an annex to the museum that will provide a new entry complex and supporting facilities for the supplementary functions freeing more exhibition spaces in the historic museum buildings. The Prado Museum is one of the leading Spanish Museums and has a noble collection of art. The project for this competition was prepared in the architect's studio "IPG" by arch. Arch. W. Michalek, W. Gilewicz, M. Lisowski, B. Podhalanski (Poland), J.P. Bridot, B. Lamy, A. Lipski (France) in cooperation with arch. Arch. K. Bialas, A. Rakoczy (Poland) and R. Hollis (USA).

2.1 The idea

The search for the first idea in the design included simultaneously a very intensive dealing with the brief of the competition, with the wide and narrow urban context of the location, the place, its atmosphere, history and present functional advantages and disadvantages. The first sketches appeared as an architectural notation of observations and thoughts. The perspective drawings were awkward, fast and not finished, many of them were thrown away, however at this stage it was our main language of "inscribed" communication.

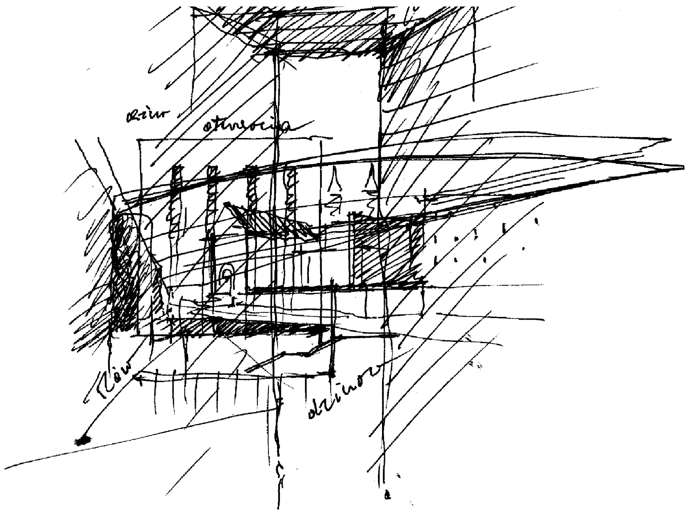

Figure 3: The first notation of Architecture

Fig. 1 is a visualisation of built-up limits on the drawing supplied by brief. It was a trial to find the volumes, main existing planes, directions and voids in the urban context. The drawing itself is a perspective superimposed on axonometric projection.

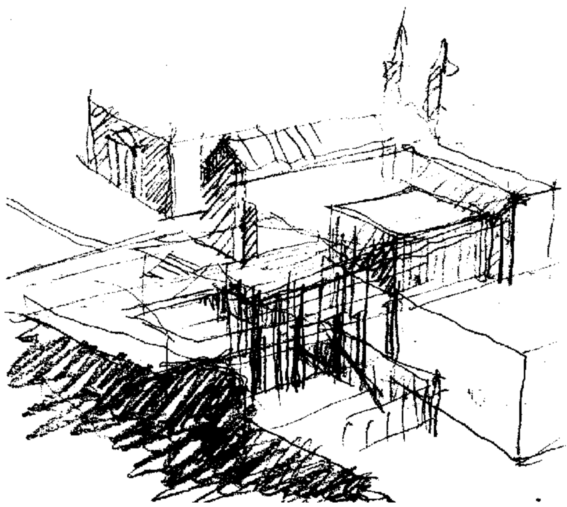

Figure 4: The study of bird-eye view

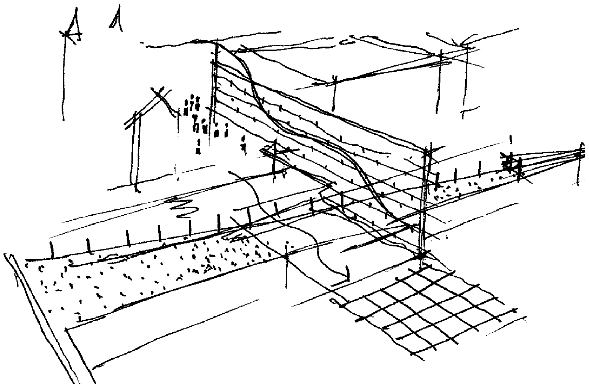

Figure 5:

"A building is more than a dwelling place; it exists in space and, as such it acts in space and has an influence on the emotions of the human beings" (Gabo [4]). The clash between urban blocks filling the site and open spaces with free standing buildings directed us to our first idea.

In the sketch of Fig. 2 there are many superimposed perspectives. We tried to establish the focal point and the main lines of the whole project composition. The drawing in Fig. 3 shows the search for an idea of directed views from "out" and "in".

The first idea of the main entrance annex as a building next to the Museum was not convincing. We were fascinated with spatial quality of the elevated plateau of the church and

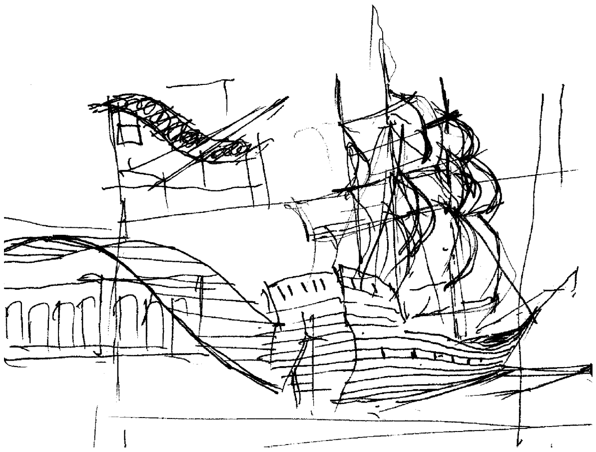

Figure 6: Search for the shape of an annex

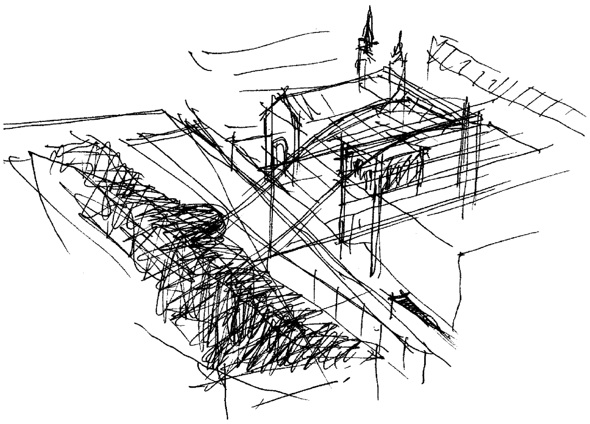

Figure 7:

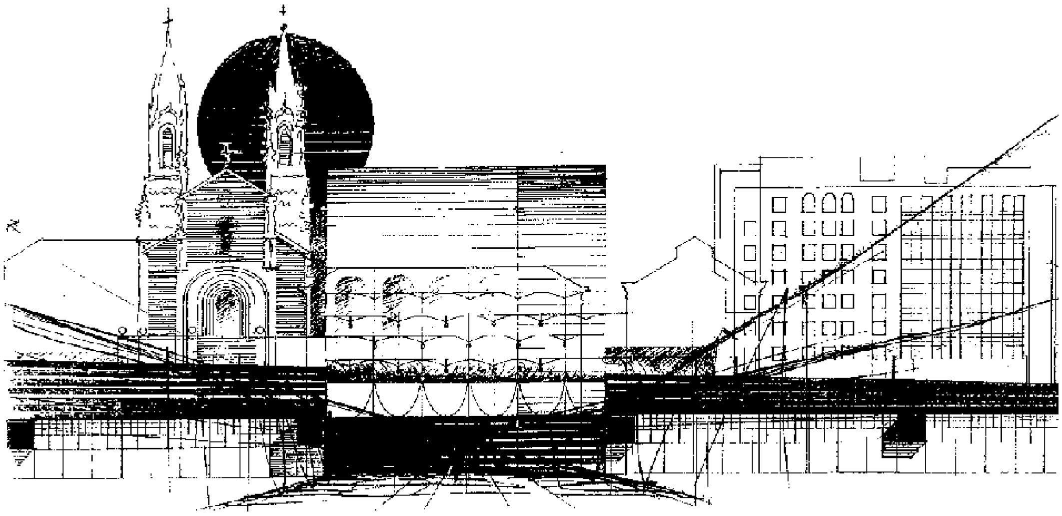

Figure 8: Searching for the composition of elevation

cloister. It might have served as a main entrance platform. The perspective sketch (Fig. 5) shows how the idea of detached entrance hall was born. It shows as well how the paradox of entry space separated from the building was solved through platforms descending under the Museum.

The annex responds to the urban plan of Madrid and does not alter the existing city grid. The intention of the annex is not to disturb the perspective that exists on the eastern plaza, directing one towards the botanical gardens beyond the Prado Museum complex.

In Fig. 8 the drawing of elevation mixed with one point perspective, in spite of incorrect geometrical construction, gave the illusion of depth in plane projection. This trick is applied very often by architects in order to increase the dynamism of drawing.

The same solution as displayed in Fig. 9 helped to find the design for the side elevation in the context of existing surrounding. Since this elevation is facing a very narrow street, the building in front of it is transparent. Fig. 10 shows the cross section introduced to find a scale for the complex and its real volume. The figures 8 and 9 were simultaneously preparatory drawings for the final rendering presentation.

The sketch of Fig. 10 was done to define the interior form of the space and its elements.

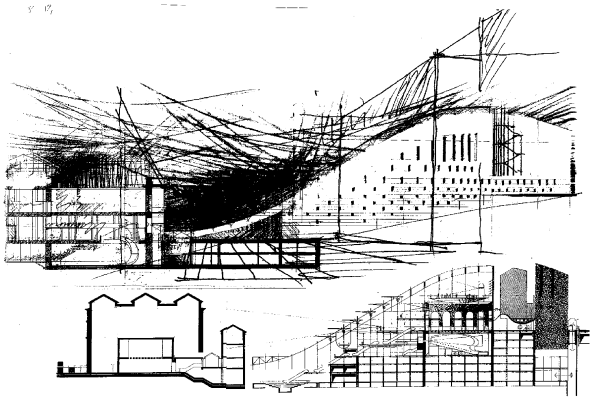

Figure 9:

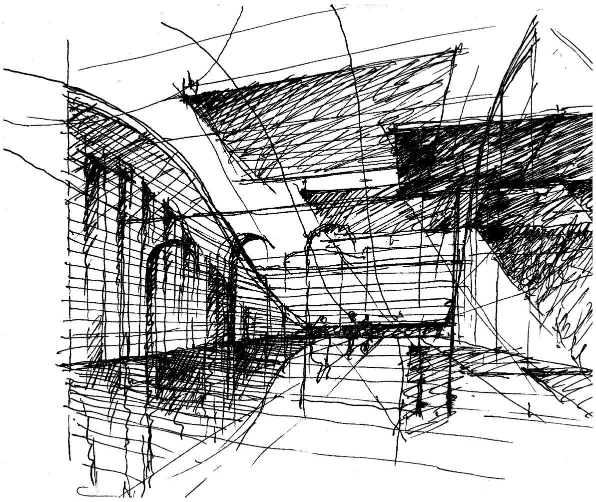

Figure 10: Searching for the interior climate of the annex

The proportion and scale were not accurate, but several drawings of this kind helped us to find the best architectural solution. In our opinion it is essential that space is erected from the inside and organized not only to functional requirements, but devised purposely to the inner dynamics, movements, spatial surprises and all the events connected with the life of such an organism.

The bird-eye view in Fig. 11 shows a complex in the urban context of the city. The technique of the drawing is an air brush paint on a colour photocopy. On this stage the CAD was useful to build and study a 3D model of the complex. There were several important corrections of the architectural image, plans and sections bound with the creation of this drawing. It precipitated the project evolution on this stage. Apart from the shape of the building, this drawing helped to study the color of architecture.

One could notice that at the beginning of the design process the perspective drawing played a double role; first, as a graphic medium of searching for mental association, symbols and design thesis, second as a notation, a quick sketch of an architectural idea having been modified while drawing. In both cases perspectives are intuitive, without reference to central projection. The depth is achieved by superimposition, transparency or isometric view. The origins of these techniques are described in Rudolf ARNHEIM's book [1], p. 252-297.

After the idea of the project is fully formed, perspective sketches along with CAD 3D models and renderings become a tool to prove it or to reject it. The design process is usually shifting towards search for solution of elevations, plans and sections. The perspective drawing, both "hand made" or produced from a CAD model, appears again at the final stage of design as a rendering in order to visualize the spatial solution. At this stage, the design is very often modified due to a better understanding of its architectural features and details uncovered by the rendering.

The importance of perspective drawing described in this paper will not finish the discussion about its role in architectural design. By many architects the perspective is questioned as being too subjective for a "conception tool", or since its nature hinders a more abstract approach toward design, especially at the beginning of the design process. However, the authors claim that *perspective drawings will always be indispensable for both, architects and their clients, to look for, to find and to comprehend architecture.*

Figure 11: The rendering of the final presentation of the project

References

[1] R. Arnheim: *Art and Visual Perception Psychology of the Creative Art.* Copyrights for the Polish edition by Wydawnictwo Artystyczne i Filmowe, Warsaw 1978.

[2] K. Bartel: *Painting perspective, vol. II.* Ed. by F. Otto, PWN Warsaw 1958.

[3] F.E. Giesecke, A. Mitchell, H.C. Spencer, I.L. Hill, J.T. Dygdon: *Technical Drawing.* 8th edition, Macmillan Publishing Comp., New York 1986.

[4] Gabo Naum: *Towards a Unity of the Constructive Arts.* Plus, No. **1**, 1938.

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