Semiotic Aspects of Architectural Graphics' History

Stela Borisova Tasheva

Center for Architectural Studies, Bulgarian Academy of Science

Abstract

The subject of this thesis are the semiotic aspects of the architectural graphics' history. It is suggested that the main expressive system in the architecture design - „architectural graphics" is to be given a new meaning in the light of semiotics, as a contemporary science paradigm. The history of the architectural drawings is to be examined as a history of a system of signs, as a growth and development of an original architectural language. The aim of this paper is to prove the necessity and also to test the limits and the range of this research area. The study must altogether present the historical base of the architectural drawing systems and to analyze the concentration of graphics' meanings, comparing to the contemporary elements in the design process. It shall also follow the existing ways of transferring architectural information, according to the audience, the culture and the building methods of the historical period. The study will focus over the communication processes in the architectural design, and will examine the key points of decoding and apprehending the architectural experience. The results of this study are expected in the fields of architectural history and education, same as in the area of visual and especially architectural semiotics. The value of this paper is to give a referance point for the future semiotics research over the architectural graphics, and another studies in the field of architectural semiotics.

1. MOTIVATION

Architectural graphic is the most important expressive system in the architectural design process. Study over its foundation, development, elements and variations will give us the start point for researching its state of art and even its future. Also today the way of **recording** architectural information is basic to its **future use and comprising.**

The word "graphics" has a Greek origin (γραφικος - "written", γραφω - «write») and means writing systems, or a set of writing tools as letters, graphemes or signs in any language. Graphics are visual presentations on surface, such as a wall, canvas, computer screen, paper, papyrus, stone, etc. They are classified as functional and artistic. Graphic design is an applied art where pictures and text are arranged aiming better communication and message transfer. Engineer types of graphics are remarkable with their thoroughness and accuracy and are usually subjects of different standards and norms.[1]

2. PROBLEM STATEMENTS

In this report the term **«graphics»** will be used with the meaning of **«data transfer and record system between an object and its own sign through visual tools».** (see figure. 1)
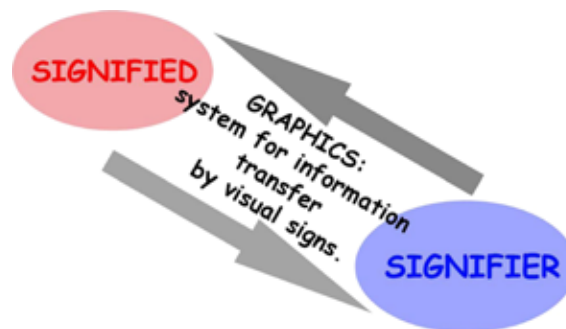

Figure 1. Graphics – data transfer and record system between an object and its own sign through visual tools

Graphic systems could be set in different context and to be considered with various interpretations. Also signs used in them could be symbolic, iconic or indexical.

«Architectural graphic» will be used with the meaning of «**formal data transfer and record system through visual tools addressed to architectural design and construction».**

In other words, *interpreting* architectural graphics is just and only in construction or architectural design sphere. (See figure 2). Thus architectural graphic could be accepted as a specific **architectural writing system.**

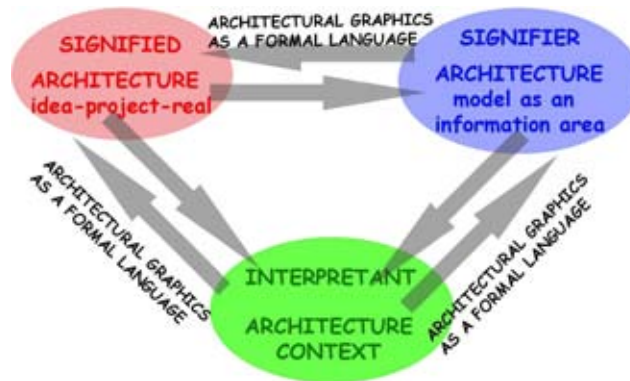[1] From Wikipedia, the free encyclopedia.

FIGURE 2. ARCHITECTURAL GRAPHIC − FORMAL LANGUAGE FOR ARCHITECTURAL
DATA TRANSFER, USING VISUAL SIGNS, SCHEME OVER THE PEIRCE TRIADIC MODEL

Architectural graphic is used as a communication tool in all design stages, and by all participants in the architectural process. Nowadays there are a couple of norms and standards concerning the type, the structure and the consistence of the architectural graphic, its main arbitrary symbols and all rules of their use.[2] Today, if we take architectural graphic as a written formal language, it contents arbitrary symbols as an «alphabet», and also rules for their use as a «grammar».[3]

Also it is good to report certain features of the **architectural graphic.**

Usually architectural graphic is created as *a two-dimensional record of a three dimensional object.* So this record should be simplified in its meaning, and with clear geometry. Also graphics should be **elaborate, exact and realistic.** With such a precise graphic accuracy, lucid data transfer is guaranteed even for the general public.

By so doing, abstract arbitrary symbols and elements of the architectural graphics are inexplicable to all uninitiated observers and mainly transfer information meant for professionals only. Thus the professional information is double coded.

Besides all iconic images some written forms of the spoken language are included to complete the architectural data transfer.

Another feature of architectural graphic is its specific **sense (meanings) saturation** by defining a group of characteristics, «translated» in technical parameters for each single object. So when we disintegrate the architectural graphics, we receive a variety of object classes.

For example the term «wall», takes the sense of «limit between two spaces». All too often these are the «inside» and the «outside» spaces, which take different meanings and positions e.g., **in** a building- **out** (in the city) - **inside** the city, **outside** the city walls, **in the state** of China - **out of the** Great Chinese Wall... In fact the term «wall» always is a limit; this limit just happens in a different scale or context. As a main element of the architectural graphic the

[2] For example ISO 128 is an international standard (ISO), about the general principles of presentation in technical drawings.

[3] According to Chomsky, each language consist of two elements: an alphabet (of signs) combined in strings, which connect in and grammar for their use (protocol).

«wall» always means some determinate agent — an **object** of the «wall» class, with inherent to this particular object size, material, structure and position in the space. In the architectural design the very role of architectural graphics is to show and define this **particular wall** which is or is to be built, the exact **object** of the «**wall» class**. Numbers and types of parameters which describe this «wall» object vary in broad limits, but the aim of all technical descriptions are to fix it undoubtedly in the present design stage.

3. APPROACH

In this report will be examined the formation of the architectural graphic as writing system, the upraise of its elements, its first characteristics, its development and changes. Due to the large volume of researched material, however, this report will make only the initial sketches over several examples in Mesopotamia Cultures.

There are a lot of images showing the architectural writing systems development from the deep past. May be one of the first is the wall relief found in a residential or sacral building in the city-state of **Çatal Höyük**[4] in today's Anatoly, Turkey, dated as occupied C. 6200 years B.C. It is a Neolithic village structure with more than 7000 inhabitants. (See figure 3.) Nowadays about 4% of the site have been examined, which is about 40 residential or sacral buildings, grouped in "districts" and divided by street corridors. This wall relief is only one of the large number of archaeological finds which prove the high stage of development of this Neolithic settlement, its organized religious and social life.

Some opinions doubt the decoding of this bas-relief.[5] It is possible that the so called «village plan» to be puzzle out as an abstract composition, some wall decoration with the motives of leopard skin spots, with unknown purposes. What were the cognitive and the analytical abilities of the Neolithic people, and was it possible for them to create a plan projection of their own environment? To some environment? The relief structure, with its repeating rectangular forms and the corridor spaces between, its specific proportions typical of residential planning, and finally the volcano sign in the context of the village situated under a mountain, give some reasons to read this **Çatal Höyük** relief even as an urban plan.

A plan? A map? A scenery? An idea? In semiotic point of view this archaeological discussion shows **the difference between the architectural graphic of some object and its image reflection.** Building parts, cityscape or interior elements have been portrayed over different surfaces from all ancient cultures. Usually they are signs, image reflections as a part of the environment, without its architectural purpose. We can say that these pictures are outside the main goals of the architectural interpretation.

[4] Çatal Höyük has been revealed in 1950. The first researcher there is the British archaeologist James Melaart between 1961-1965.The excavation are renewed in 1993 г. Nowadays there have been teams of researchers from the university of Cambridge, Stanford, Berkley, London, Istanbul and more. The source of the used information is the official site of the cave - http://www.catalhoyuk.com

[5] «A bird's eye view - of a leopard's spots. The 'map' and the development of cartographic representation in prehistory», Stephanie Meece, The British Institute of Archaeology at Ankara, 2006.
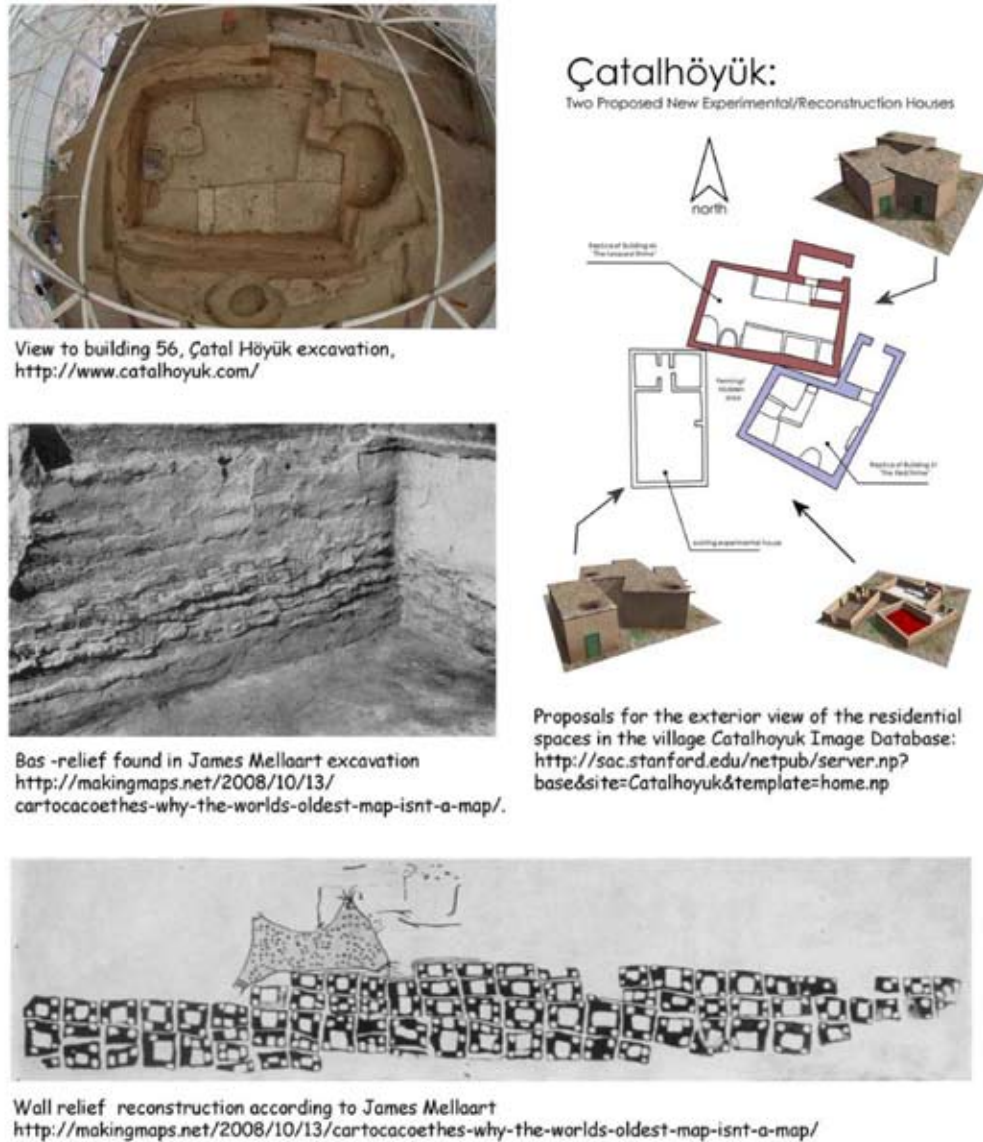
View to building 56, Çatal Höyük excavation,
http://www.catalhoyuk.com/

Bas -relief found in James Mellaart excavation
http://makingmaps.net/2008/10/13/
cartocacoethes-why-the-worlds-oldest-map-isnt-a-map/.

Çatalhöyük:
Two Proposed New Experimental/Reconstruction Houses

Proposals for the exterior view of the residential
spaces in the village Catalhoyuk Image Database:
http://sac.stanford.edu/netpub/server.np?
base&site=Catalhoyuk&template=home.np

Wall relief reconstruction according to James Mellaart
http://makingmaps.net/2008/10/13/cartocacoethes-why-the-worlds-oldest-map-isnt-a-map/

FIGURE. 3. **ÇATAL HÖYÜK** – EXCAVATIONS AND RECONSTRUCTION

Let see a couple of graphics from the Ancient Mesopotamia Cultures (See figure.4) The first two objects— the «**Ushumgal Stele» and the «Kudurru relief»** are to represent some market relations — land gifts or the change of the ownership over some articles. In these cases the architectural elements are used as ideograms, as parts of pictorial text. They represent the houses (temples) of Gods and are part of the Cosmos and Universe record. Despite we can read their information, they respond to no architectural standards. In the third example, we see a more detailed castle imaging, which gives a lot more information about the exterior architectural elements, but the relief interpretation is focused over the city siege preformed of the Assyrian king Ashurnassirpal II. In this case, again the image purpose is rather scenery, than architecture.

Early Dynastic I; 2900–2600 B.C.
Mesopotamia, Umma
The Sumerian inscription on this
stele records a transaction involving
three fields, three houses,
and some livestock between Ushumgal,
a priest of the god Shara, and his daughter.

Babylonian kudurru
of the Kassite Period,
known as the "Michaux Stone".
The stele bears an
inscription (a property charter)
in Akkadian script.
Black serpentine,
early 11th century BC,
found near Baghdad in
1876 by the
French botanist Michaux
Source : wikimedia
wikipedia, internet.

Ashurnasirpal II besieging a town, with a wooden 'tower'. 865BC-860BC.

Figure 4. Graphics showing simultaneously main events
and the vision of some architectural elements

Lets examine the «**circular warrior camp**» on figure 5. This relief is dated C. 865-860 B. C., Assyria. The fact of using a plan as **a signifier** to represent a building **(a signified),** instead of using gorgeous elevations and decorations is quite important. The point is that gorgeous facades are exactly what is visible, whether a plan has to be understood as an organization of space, even with its unseen parts. This also shows an existing conditional way of thinking, which takes a schematic two-dimensional plan as a sign of a three dimensional architectural space. The towers, the city walls and the doors shown as vertical elements in the previous figure are horizontally indexed to a full site plan. Thus they are transformed in an architectural arbitrary symbols — classes of «tower», «wall» and «road». This warrior camp also has clear functional districts- by the road crossed in the centre of the circle, it is divided in four quarters. In each quarter are shown as graphic elevation views some labour activities, and in the down right quarter a priest with a flat hat is reading the future in the entrails of sacrificed animal. The plan

itself is quite schematic, creating the term of «warrior camp» as a part of whole story, again in the context of military activities. From this plan no technical information for the camp can be extracted. There are no clues about the size and the type of the towers, and the relief cannot be used for any building instructions, except the most general ideas for form and purpose. Ergo we see here a scenery again, and despite the defining of architectural classes in this relief we have no architectural interpretation.

© Trustees of the British Museum, Nimrud Gallery
A scene in the Assyrian camp. C. 865BC-860BC, Gypsum wall panel relief
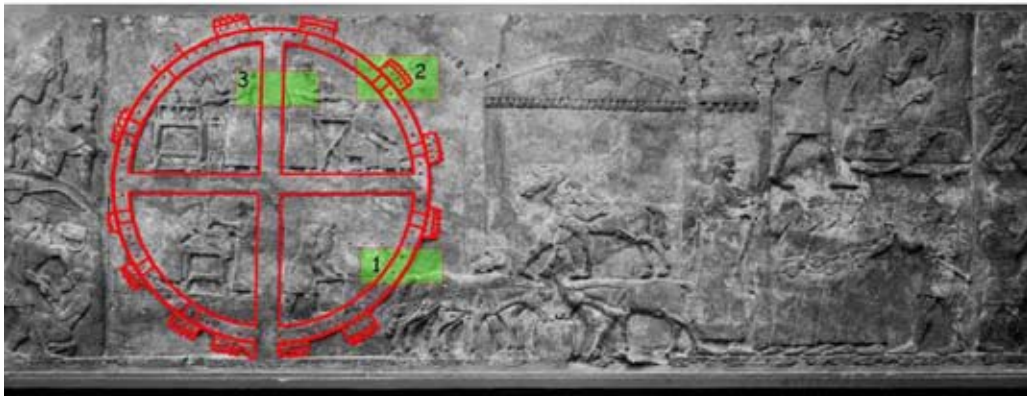
© Trustees of the British Museum, Nimrud Gallery
A scene in the Assyrian camp. C. 865BC-860BC, Gypsum wall panel relief
Defining arbitrary architectural symbols: 1. Wall
2. Tower
3. Road
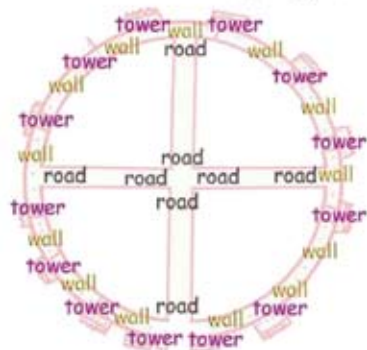
DEFINING **CLASSES** OF
ARBITRARY SYMBOLS:
road
tower
wall

/personal graphic/

FIGURE 5. PLAN OF ASSYRIAN WARRIOR CAMP C. 865-860 B. C.
ANALYSIS AND ARCHITECTURAL CLASS DEFINING

May be one of the first architectural plans is the plan of a building (palace or temple) in the town of Lagash[6] (C.2120 years B.C.) engraved over a stone plate in the lap of the statue of prince Gudea.[7] The sculpture is part of the group of statues of Gudea, found in the excavations in the temple of E-ninnu, Sumer, and is located in the Near East Antiques Collection of Louvre. Over the statue dress and over the nine columns of its throne is created the longest Sumerian inscription. In the text are included the reasons to build the temple, its main principles according to the divine directions, description of the materials used in the construction, and even warnings to any future violations. The description of building materials consist cedars from Amanus, stones from northern Syria, and booty captured in Elam. A scale line is shown on the edge of the plate, giving measurements to the elements, and confirming to all observers the unique purpose of the plan — **to transfer architectural information.** In this plan, we read not only the classes of the architectural elements — walls, buttresses, towers, but also their specific **size, form and disposition,** we read the architectural **objects**. In the ancient plan of Building in Lagash we can study the first formation of the architectural writing system /see figure.6/.

Despite all visible arbitrary symbols on this plan, in the third millennium B.C. this kind of drawing cannot be totally understood by uneducated and uninitiated people. Indexical to the statue exist two cylinders with cuneiform text describing all the functions of the temple, its construction and different aspect of its use. Statue of Gudea is set out in the temple as a message: messages for the ceremonies in front of the people, and even to God Himself.[8] Some researchers take Gudea statues as a «living Cod», representative of the prince, or even divine reincarnations. So it is possible to say, that this plate relief is an attempt to create a full record of a temple, by means of architectural graphic, as its representation in celestial spheres. The curious fact that the statue is called «Gudea – The Architect» is no accident.

In Gudea's plan internal space is not treated, and there are no instructions or illustrations of its function. The steady cascade structure of the interior, however, corresponds to the cascade Sumerian vision for the overall layout of the universe.[9]

A common plan can be found on a **clay tablet with size of 9 and 11 cm, from the end of the third millennium B. C., town of Teloh** (Girsu). (See figure 7). Additional information about the rooms is written with cuneiform texts in the tablet. There are no visible arbitrary signs of scale, but it is possible to get technical information from the plan using the wall thickness and the size of the openings, which are probably well known by the ancient builders. It is interesting to look the internal space plan of this drawing. All rooms have clear structure and complicated connections, but there are no clues to their functions. So may be the important in this plan is defining (enclosing) of spaces with exact geometry, and the links between these spaces. Thus the spaces (the rooms) have multiple-purpose function.

For a clear understanding of the specificity of architectural graphic we can compare this plan with the graphic representation of the Assyrian war camp on the same figure. It has an
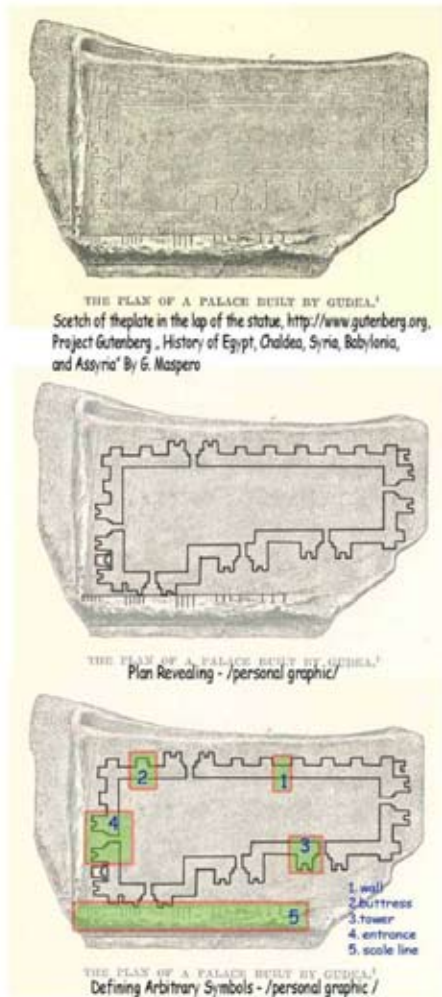
[6] Lagash (modern Tell al-Hiba, Iraq) was one of the oldest cities of Sumer.

[7] Sculpture of Gudea, prince of Lagash, as an architect and builder, Louvre, Paris, France.

[8] «Kingship and the gods a study of ancient Near Eastern religion as the integration of society & nature», by Henri Frankfort, Chicago [u.a.] Univ. of Chicago Press 1962.

[9] Wikipedia, Mesopotamian mythology.

elliptical form, and surrounding wall with towers. Its interior is divided in two parts by longitudinal central road. In each half are illustrated several activities located in successive areas of space, closed in their own tents or buildings, and connections among these activities are not marked. Thus the two halves of the camp are treated as landscape, and there is no specialized spatial information in the images.
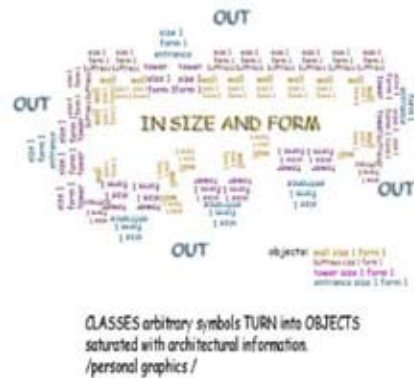

FIGURE. 6. PLAN OF A BUILDING IN LAGASH. ANALYSIS AND BASIC **CLASS** DEFINING
OF THE MAJOR ARCHITECTURAL SIGNS AND THEIR FULL DECODING AS **OBJECTS**

Plans of a six-room building, a sanctuary or a private house.
Clay, late 3rd millennium BC. From Telloh, ancient Girsu,
Department of Near Eastern antiquities, Richelieu,
Source/Photographer Marie-Lan Nguyen - wikimedia.

plan revealing sketch.
/personal graphics/

© Trustees of the British Museum
Gypsum wall panel relief: 700BC-692BC
showing an Assyrian base camp. It is fortified
with a road through the middle. Servants work in tents.

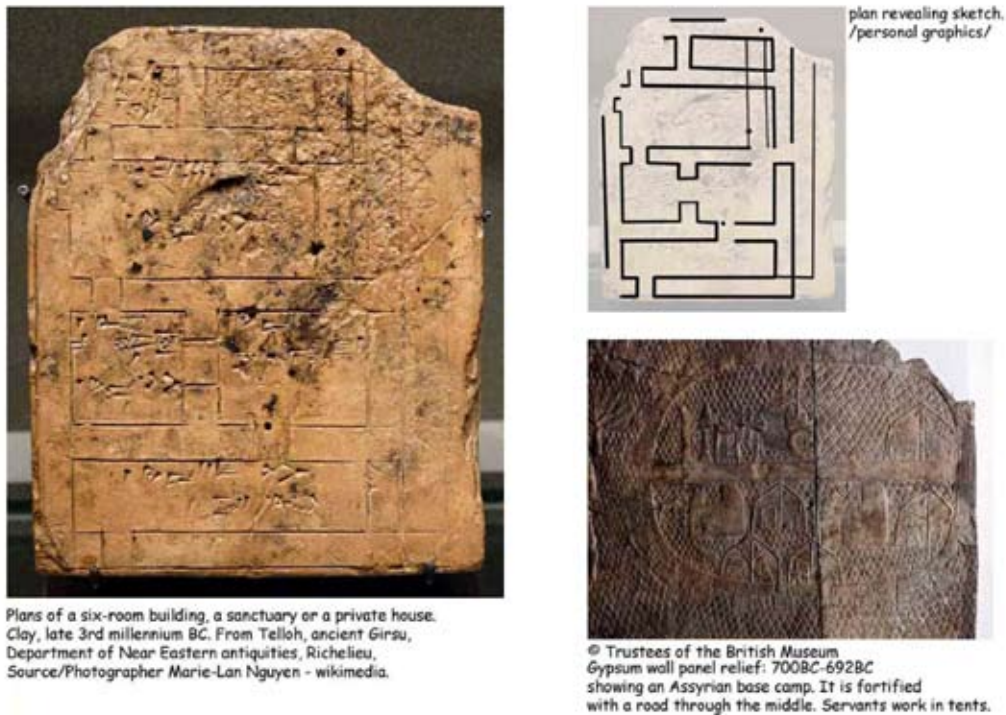FIGURE 7. PLANS OF A SIX-ROOM BUILDING, A SANCTUARY OR A PRIVATE HOUSE.
CLAY, LATE 3RD MILLENNIUM BC. FROM TELLOH, ANCIENT GIRSU[10]

4. RESULTS

Architectural graphic progresses as any other writing system, parallel to the civilization that uses it. Architectural information record changes its character according the available surfaces — rocks, clay, murals, leather, papyrus or paper; according to the geographic pattern of the region, or the implementation technology, etc. The number of the used arbitrary symbols grows; they are saturated with more and more meanings. It is supplemented with analogies from other visual sign systems: mathematical, artistic or parts of text. From abstract symbols, ideograms and sketches, architectural graphic gradually converts into precise detail characters. Architectural drawings of ancient civilizations are joint graphics signs, but architecture in general in those historical periods is also conjoint. With the development of architectural language, with its enrichment of construction, decorative, artistic and expressive elements, the sign system that records it also ennobles. In addition, architectural sketches of plans obtain saturation in their primary structures - inside them are interlaced more common geometric symbols. Thus, the "texts" of architectural graphic language are differentiated and complemented.

Lets bring out the first traits of written architectural expression as an independent graphics system, found in Mesopotamia cultures.

[10] Ngirsu (also: G̃irsu, Girsu, Jirsu) is modern Tell Telloh, Iraq.

1. The purpose of the graphic should be professional communication, regarding a specific architectural or building project and its prospective vision.

2. A two-dimensional projection is used for representation of a three-dimensional architectural object.

3. Architectural symbols are used as **objects**, with a set of unique describing them parameters.

4. There is some indication of architectural elements' size through scale lines, inscriptions, a modular unit or otherwise.

These hallmarks can be found in architectural drawings of all ancient civilizations.

5. CONCLUSIONS

After tracing the architectural graphics' history we can expect with a great deal of security that:

With the development of the architectural and construction processes, the hallmarks of the architectural graphic also change and upgrade.

New principles of scale making are evolved, as well the existing graphic elements are specialize in different areas.

In the architectural written language are also highlighted all used materials and structure elements.

Mathematical knowledge and systems are also introduced — for example different geometric methods of display in Monge, in axonometrical or perspective projections.

This report notes the beginning of a long road that architectural graphics makes from 7 millennium B.C. to its modern forms in the computer technology era.

The foundation of the architectural graphic as a writing systems leaves a lot of open questions in various scientific areas.

Their answers are to come.

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