REFLECTIONS ON THE APPROPRIATENESS OF GEOSTATISTICAL GENERALIZATIONS IN TERRITORIAL RESEARCH

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Abstract

Modern geography is an expanding discipline, including the emergence of over 30 branches, most resulted from the interference with other sciences, including the import and export of concepts and methods. The process resulted into the generalization of geography as science of the organized space. Nevertheless, although the process was generally beneficial (especially for professionals from other disciplines, who have benefit upon the productivity of geographical approaches), it induced to the geographers a fear of loosing their object of study.

This paper consists of a series of reflections on the geostatistical approaches used in territorial research. Geostatistical methods have been previously defined as those methods ranging from pure geographical approaches, consisting of describing the particular features of each unique place, to statistical and mathematical models, that tend to generalize and define a new geography, sometimes lacking the initial territorial relevance. In fact, a range of five types of geostatistical approaches have been defined based on the degree of interference between geography and statistics or abstractness, but also accounting for the overall research goal: (1) pure geographical approaches, with maximal territorial relevance, and no mathematical abstractness; (2) geographical approaches with some quantitative relevance, which maintain the territorial relevance, but also include some statistical processing, as simple as interval grouping; (3) equal mixture of geographical and statistical approaches, such as grouping the results of mathematical computations applied to a set of geographical units, eventually dissolving the geographical borders; (4) mathematical approaches applied to a set of variables including geographical ones, and expanding to their territorial representations; the results lack the geographical relevance; and (5) mathematical models that define abstract spaces and loose the geographical relevance. Some of the previous examples of outputs obtained from the application of geostatistical techniques to territorial research include generalizations obtained using a wide range of approaches, from simple interpolations of spatial data to interpolations of mathematical constructs, consisting of the results of tests applied to the original data. Occasionally, such generalizations have created a new, virtual space, replacing the traditional and visible one. Nevertheless, after using for a long time these approaches extensively with good results (in terms of deriving new knowledge), the attempt to connect their outputs with the planning practice has clearly indicated a very pragmatic need for being able to relate them to the concrete territorial reality. The constructions generated by these techniques are sometime hardly explainable to the broad public, and to those in charge with deciding on their relevance for the future development of their communities or territories. One of the important issues related to the appropriate use of geostatistical approaches in territorial research relates to the choice of their different parameters. This is merely a corollary of the famous statement by Mark Twain – "There are three kinds of lies: lies, damn lies, and statistics". The choice of one approach or another might be a question of preferring disparities to continuity, imbalances to equilibrium, contextual relevance to replication, visual impact to scientific

accuracy etc. The question becomes crucial when the output consists of hierarchies. Of equal importance, but from an epistemological perspective, is the question whether spatial relationships involve other relationships when applying geographical tools in different areas of research. Does geographical proximity (or clustering) indicate an aggregating trend or, on the opposite side, does distancing indicate avoidance? In many cases, results have clearly indicated that a relationship of a different nature has spatial consequences, but the reverse does not necessarily hold true. In other words, to provide an ecological example, if two species are symbiotic, they will cluster together, but clustering can also imply amensalism, comensalism, and even predatorism. Last but not least, results tend to show that abstract methods are more suitable for large systems and long periods of times, while the territorially-relevant methods are appropriate for the small spaces and short periods of time.

Keywords: multi/ inter/ trans-disciplinarity; methodology; general vs. particular; spatial interpolation; epistemology

1 THE RELATIONSHIP BETWEEN GEOGRAPHY AND OTHER DISCIPLINES IN THE CONTEXT OF MULTI-, TRANS- AND INTER-DISCIPLINARITY

1.1 Cooperation of Different Subjects

Modern science seems to grow through the systemic cooperation of subjects [30]; more and more studies and journals promote research that crosses the traditional boundaries between disciplines. In epistemological terms, the transfer of concepts and methods is discussed by synergetics, a science of analogies between natural and human sciences regardless of the scale [10].

According to most authors, the degree of cooperation between different subjects increases on a qualitative scale: (1) multi-disciplinarity – simple reunion of more subjects, (2) trans-disciplinarity – the united subjects establish interconnections consisting of the transfer of concepts and methods, and (3) inter-disciplinarity – the interconnections tighten and result into the emergence of new subjects [2], [3], [4], [5], [6], [14], [16], [18], [23], [32].

The cooperative approach described above is not characteristic to sciences only, but also draws a new relationship between arts and sciences [17].

1.2 Growth of Geography through Cooperation with Other Subjects

Modern geography is the result of an expansion process, resulting into over 30 branches [31], most of which are the output of productive cooperation with other subjects [24].

As a result, geography became the ‘science of the organized space’ [12], but also induced to geographers the fear of loosing their object of study [12]. However, specialists in different subjects, even non-spatial, have found geographical methods to be productive tools, extremely useful in their activity [11], [21], [24].

As a particular example, the extensive use of Geographical Information Systems in other subjects created a new science, called Geographical Information Science (briefly GIScience), dealing with the application of geospatial techniques to answer essential scientific questions [8], [9].

1.3 Cooperation of Geography and Statistics. Geostatistical Approaches

This paper is focused on the particular relationship between geography and statistics. Starting from the example of biostatistics (the trans-disciplinary result of exchanges between biology and statistics), Petrişor [21] proposed an expansion of the traditional meaning of 'geostatistical approaches' from the spatial interpolation techniques assuming autocorrelation to "*all methods placed at the interference of statistical and geographical techniques, from quantitative methods applied to geographical data to the geographical representation of the results of statistical analyses*".

It can easily be noticed that the definition includes methods ranging from pure geographical approaches (consisting of descriptions and analyses of the particular features of each unique place, and comparisons of case studies), to statistical and mathematical models (including extrapolations, generalizations and even the creation of a new 'geography' or representation of the space, sometimes lacking the initial territorial relevance, or even any territorial relevance).

The need for quantitative approaches in geography is proven by statements like "*for a long time, disparities have been described, but not measured*" [1] in correlation with the importance of disparities in regional development [12], or the comparison with other sciences, benefiting upon the statistical substantiation of results [11].

1.3.1 Classification of Geostatistical Approaches

The classification proposed by Petrişor [21] includes five classes, defined based on the degree of interference between geography and statistics (which is also proportional to the level of abstractness) and for the overall research goal:

(1) pure geographical approaches (characterized by maximal territorial relevance and no mathematical abstractness),

(2) geographical approaches with mathematical elements (characterized by maintaining their territorial relevance, but also including some statistical or mathematical processing, such as the simple interval grouping),

(3) equal mixture of geographical and statistical approaches (the connection with the territory is very weak, and the level of abstractness is average; examples include grouping the results of mathematical computations applied to a set of geographical units, eventually dissolving the geographical borders),

(4) mathematical approaches applied to a set of variables including geographical ones, and expanding to their territorial representations (characterized by the lack of geographical relevance and high degree of abstractness), and

(5) mathematical models (they may define abstract spaces, but loose the geographical relevance and have the maximum abstractness).

2 EXAMPLES OF APPLYING THE GEOSTATISTICAL APPROACHES

2.1 Results

This paper is not presenting new results, but analyzes the previous one. Some of the previous outputs obtained from applying geostatistical techniques to territorial research include generalizations obtained using a wide range of approaches, from simple interpolations of spatial data, via ordinary kriging [26] or radial basis functions [29], to interpolations of

mathematical constructs, such as the results of tests applied to the original data [13]. In some cases, generalizations have created a distorted or new, virtual space, replacing the traditional and visible one [7], [24], [28].

2.2 Epistemological Discussion on the Significance of Results

After using for a long time these approaches extensively with good results (in terms of deriving new knowledge), the attempt to connect thee outputs with the planning practice has clearly indicated a very pragmatic need for being able to relate them to the concrete territorial reality. In summary, there were several limitations in applying them, underlined by:

(1) knowing the mathematical constraints applicable to the data before applying a method – if the data do not fit the requirements, results must be interpreted with caution [22].

For example, kriging assumes that the spatial distribution is the only variable that influences the magnitude of a certain variable. Obviously, this is an oversimplification, because for example in ecology high or low densities are not a consequence of the geographic location, but of the environmental conditions at that particular location.

(2) over-generalization – statistics treats all units in a sample in the same way, attributing variability to random fluctuations; while this is very true with data fitting a mathematical model (chemistry, physics), in life or social sciences mathematical models are over-simplifying [22].

To illustrate this statement, consider the theory of urban attraction. Basically, the theory is an attempt to adapt the universal law of gravity to the relationship between cities, stating that "*two cities attract buyers from the neighboring rural area in an approximate direct relation with their population and inverse relation with the squared distance to the place in question*" [12], or, in a more generalized format, "*the influence of a city over the surrounding space decreases with distance and increases with its importance given by size and even more by its population*" [12]. If this law is applied as it is, the cities must be considered perfect circles, as otherwise the irregular shape might require special modeling. Furthermore, assumptions include an even distribution of population and activities within and outside the city. Researchers from other fields, such as biology or ecology, are required to present a solid substantiation of any theoretical development involving a polynomial relationship above the linear trend – quadratic or superior power; it is unlikely that cities work in the same way as the laws of physics would require.

(3) inferring causality must be done cautiously. The question is, 'Does geographical proximity (or clustering) indicate an aggregating trend or, on the opposite side, does distancing indicate avoidance?' In many cases, results have clearly indicated that a relationship of a different nature has spatial consequences, but the reverse does not necessarily hold true [22]. For example, in ecology if two species are symbiotic, they will cluster together, but clustering can also imply amensalism, comensalism, and even predatorism.

A very good example is offered by clusters. A distinction can be made between artificial clusters, resulting from the tendency of humans to organize the space, and natural clusters, which can be spatial, when they occur due to natural phenomena, such as the affinity of elements for each other, or common reaction to a barrier or to an attractant or repellent factor (e.g., species avoiding some restrictive conditions when space is limited, seeking together for something – water in dry areas etc.) or functional, when elements are grouped because they work together as an unit [22].

(4) publication bias: positivism has induced the model 'observations – hypotheses – experiments – data – statistical analysis – confirmation or rejection of hypotheses' to almost all research areas; as a consequence, statistical methods are a 'must' [25]. The question is whether this requirement is legitimate.

The ethical question becomes even more pregnant in territorial research where experiments are no possible, and comparisons of case studies loose their sense if the particulars of each case study are disregarded.

(5) time and space scale: abstract methods are more suitable for large systems and long periods of times, while the territorially-relevant methods are appropriate for the small spaces and short periods of time [22].

Furthermore, in addition to the theoretical constraint, practical constraints have a similar consequence. In ArcView, spatial interpolation is impossible for less than 12 units.

(6) abstract constructions are sometime hardly explainable to the broad public, and to those in charge with deciding on their relevance for the future development of their communities or territories.

The question becomes crucial when the output consists of hierarchies. Lacaze [15] stresses out the importance of communication in planning; communication must be adequate and change with the type of actor – political decider, general public etc.

(7) computer-assisted methods ask the user to choose different parameters. The choice of one approach or another might be a question of preferring disparities to continuity, imbalances to equilibrium, contextual relevance to replication, visual impact to scientific accuracy etc.

This is merely a corollary of the famous statement by Mark Twain – "There are three kinds of lies: lies, damn lies, and statistics". This point will be illustrated in the next section.

2.2.1 Hypothetical Example of Involving Geostatistical Approaches in Territorial Research

Let's assume that a researcher plans to look at a territory, consisting of administrative units of different sizes, and find the 'underdeveloped areas'. For each set of units, here is a set of indicators, such as the per capita GDP, amount of foreign investments, number of firms etc. As simple as the question looks, the researcher faces a multitude of approaches. First of all, even the choice of the original set of indicators is questionable; second, in such situations it is customary to build up an index, which represents a linear combination of more indicators, eventually with different weights. The first question is how weights are going to be assigned. To answer this question, the researcher has a set of possible answers:

(1) if the user wants to abide to traditional principles and account for the fact that urban planning must be participatory [15], the weights can be derived from public or expert consultation, using a Delphi approach to derive the weights [19];

(2) if the user wants to be impartial, equal weights are assigned;

(3) if the user has a certain mathematical background, data can be used to derive the weights, for example by applying Principal Component Analysis [27]. This method has also the advantage of reducing the initial set of variables to a subset of the most relevant ones, but is hard to explain to the general public.

Furthermore, the choice is determined by the ultimate goal; a clear distinction can be made between planning and research. A planner, aiming to produce a strategy for the development of the area, would be more interested in a participatory approach, more appropriate to the

nature of the planning process [15]. On the other side, a researcher would prefer the statistical approach due to its objectivity and ability to replicate the results [19].

Once the weights are assigned, and the index built, the question comes to grouping its values into intervals. In this case, the researcher has to choose between several classic representations [22], [24]:

(1) equal intervals: take the difference between the maximum and the minimum value and divide it in equal intervals; if the distribution is skewed, and especially if outliers are present, the method results into 'empty' intervals, and is very good for underlining disparities; however, when the gap between outliers and the other values is too large, only the end intervals are populated, and the maps do not say too much;

(2) natural breaks: the method, based on Jenk's optimization formula, minimizes the variability within each class; although the results are very good in terms of pinpointing disparities, the application of this method is confined to each data set, and the results are hardly comparable

(3) standard deviation: classes are defined as intervals obtained subtracting or adding a certain (integer) number of standard deviations from the mean; the method is very efficient in distributions containing outliers

(4) equal areas: group the values in intervals such that the total area of units from all intervals is the same; the method produce hardly understandable results in skewed distributions, 'forcing' a certain visual equality

(5) quantiles group the values in intervals such that each interval has the same number of values; for example, if there are 40 units and the researcher needs 5 intervals, values must be ordered and the first interval consists of the first lowest values etc.

In addition to them, there are other approaches which involve statistics and even distortions:

(1) ordinary kriging interpolation – in order to find 'regions', other than by spatial contiguity (*e.g.*, in the previous cases, adjacent units falling in the same interval), the interpolation approach [26] consists of: (a) reducing each unit to its geometrical center, (b) interpolating centers based on the value of the indicator grouping them into intervals (again, several choices possible),

(2) ScapeToad exaggeration: the program creates 'bubble maps' distorting the real space to emphasize certain values [7].

As it can be seen in this example, a problem as simple as the one introduces the researcher to a multitude of choices, each of them influencing the final distribution and results. When such results are presented to a political decider, whose main question might be 'why is my unit in the underdeveloped area', vivid discussions are more than expectable.

3 CONCLUSIONS

The paper presented the need to use statistical methods in geography, including their benefits. However, in territorial planning participatory approaches require methodologies that are easy to explain and produce results that are easy to understand. The increase of mathematical abstractness distances the results from reality, transforming them in artificial constructs, which loose their territorial connection, essential to geography. In addition to this, the fact that spatial relationships do not necessarily involve causality should make a territorial researcher cautious when interpreting the significance of findings resulted from such

approaches. In summary, geostatistical approaches are an important tool, but it should be used with caution, as their generalizing power is also their most important weakness.

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PROJECT FOR TOURISTICAL VALORISATION AND DEVELOPMENT OF THE CASTLE PLATEAU IN SUCEAVA, THROUGH NEW CONCEPT FOR VISITORS AND THE CONSTRUCTION OF A NEW INFORMATION CENTER

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As stated in the title the project includes many aspects concerning a district in the north-eastern part of Romania. The intention is to begin from a regional level, to go into city level, than into local setting to end the project with an architectural proposal. In each case the existing situation is analyzed, the main problems are discussed and a punctual or general solution is proposed.

1 PROJECT LOCATION. REGIONAL SITUATION

The first part regards the location of the project and the particularities of the territory. The focus of this chapter is the presentation of the road, rail and air accessibility in relation to the studied areas.

1.1 Particularities about the region. Accessibility

The site of the project lies on the north eastern side of Romania in Suceava district. Suceava is served by an airport, which at the moment is closed for renovation in order to transform it into an international one. The main part of the district, which embodies Suceava city is included in the historical province Bucovina.

The road network is dominated by the European road E85 direction Bucharest in south and direction Ukraine in Nord and the E576 direction Cluj-Napoca , in west.

The railroad infrastructure facilitates the following connections: Ukraine (Nord), Botosani (East),Bucharest (South), Timisoara (West).

1.2 Strategy for the painted monasteries

The painted monasteries are since 1993 part of the UNESCO world heritage and they count as unique in the world. Even though the monasteries from Suceava district aren't located so far away from one another, they are these days isolated from the general public reach being only by car accessible. The distance from a monastery to the nearest public transportation stop averages round 10-15 km. This means that the public transportation infrastructure lacks almost completely.

In order to capitalize the importance of the monasteries and to solve the problem of the deficiency of connections to the public transportation system, a new touristic bus-shuttle is introduced. It connects the main monasteries and it has a fix schedule.

Fig 1 Bus-Shuttle proposal between monasteries.

2 SITE ANALYSIS

The second chapter deals with the site analysis and the presentation of the existing problems.

2.1 Existing situation

The studied area covers the center of the city, a big part of Sipote Park, the Pacea cemetery, the traditional village museum, the statue of Stephen the great and the castle.

The existing constructions are represented mainly by blocks of flats, old protected buildings in the center of the city and single-family houses near the park. A specific situation concerns the castle and its surroundings. In this region only little intervention is allowed, mainly one which does not affect the historical remains from over 500 years ago.

Fig 2. Buildings inside the studied area.

The topography of the researched area is very diverse. The city, the statue and the castle are situated almost at the same height. In between them lies Sipote Park. The park is crossed by Sipote stream, whose bed is the lowest line of the site.

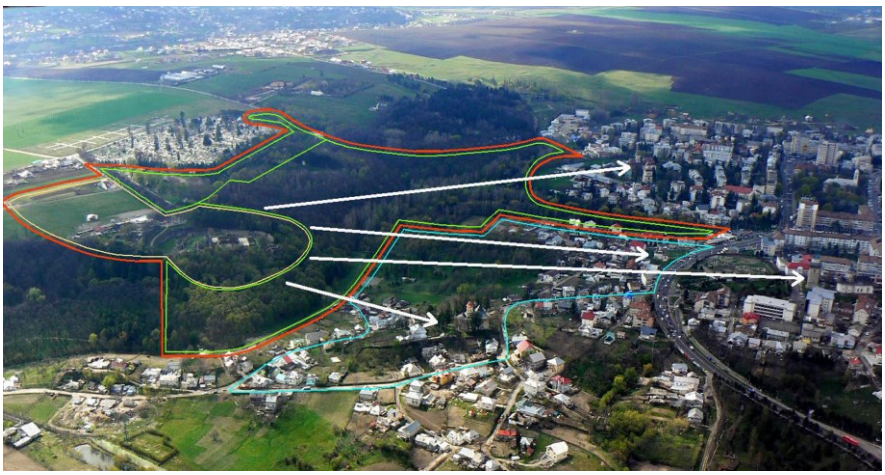

Fig 3. View directions inside the site. [3]

2.2 Problems

Beyond the diversity of plants, fresh air and the calm atmosphere, the place shows a number of problems, which appear mainly after a closer observation. Exactly from the beginning strikes the fact that the orientation signs are completely missing. For one person which comes for the first time in the region is almost impossible to find their way from the center of the town to the fortress.

The pedestrian alleys are not suited for a frequent use. They have a small number of benches which are not in a proper state.

The walking paths are damaged, forcing the visitors to face the risk of falling down or hitting a sharp stone and injury themselves.

In some areas the pedestrian ways and the cycling lines are missing complete.

3 GENERAL URBANISTIC STRATEGY

The main purpose of the next project stage is to bring more orientation into the park and to facilitate an easier and more comfortable access for the tourists coming from the city center to the castle.

3.1 Interventions concerning the entire area

The street network grew organic with the city and follow the topography of the terrain. The connection between the town and the castle is carried out through a 2 km long street.The pedestrian alleys appeared as a necessity near the buildings of the city. At the moment the only organized parking lots are located in the city center.

Nowadays the nearest public transportation connections are the station Banca or City Center. From there the tourist must find his way to the castle and walk 15-20 min through the forest on unmaintained alleys.

The only measure taken in relation to the road network concerns the removal of the entrance street to the king Stephen statue.

The next step in the development strategy is the extension of the pedestrian way system, in the places where the necessity asks to (mainly where the alleys end spontaneous). In order to be useful to project purposes, a new parking lot is designed near the castle plateau. In this way, the conditions for the tourists are improved.

A new bus line City-castle-city is planned for the persons who don't possess a car or for the tourists groups.

The cycling lanes are missing completely from the project area. For this reason a new cycling lane is designed near the existing street as an alternative to cars.

3.2 The establishment of a promenade near Sipote stream

One of the main measures for the park concerns the establishment of a promenade which follows the stream bed. The design of the promenade is thought to be as simple as possible in order not to interfere a lot with the natural equilibrium of the forest. The large width allows the bicyclist to pass by.

Fig 4. Photo-collage containing an existing photo and the proposal for the promenade.

In the moment there is no illuminated pedestrian way between the fortress and the city. But there is a big necessity during the events which take place at the castle until nighttime. For this purpose the shortest connection alley between the castle and the city is illuminated.

3.3 Other general measures

The today situation in relation to the space use is the following: the city occupies half of the studied area, the park takes one quarter, and the rest of the surface is represented by the cemetery the village museum and the castle with its plateau. At this point I need to mention that one half of the village museum is closed.

There are also other measures taken in regard to the entire area. In the places where the possibility exists the forest surface is enlarged. Another change meets the village museum. Exactly like it was mentioned before the access to the king Stephen statue was eliminated. In this way the both parts of the village museum can be reunited.

Fig 5. The final Masterplan.

4 NEW ORGANIZATION FOR THE CASTLE PLATEAU

4.1 Existing situation on the castle plateau

What strikes from the beginning is the fact that the organization lacks almost completely. At first glance it is easy to observe a number of buildings that have nothing to do with each other. The castle and the museum entrance are not clearly visible. They are also not connected to each other.

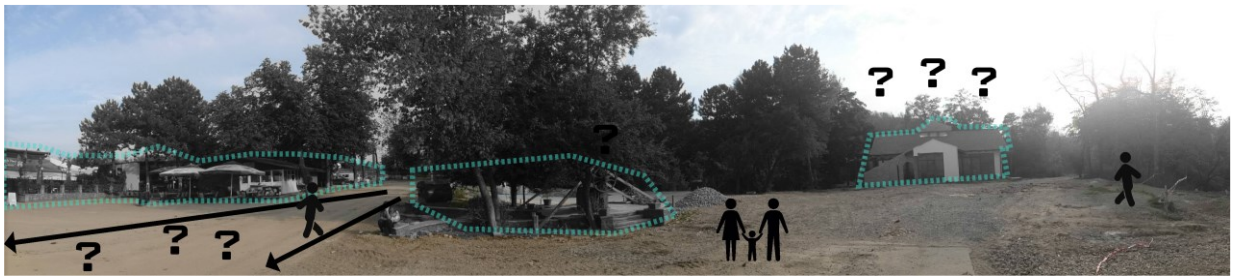
Fig 6. Analysis on the existing situation with the marking of a part of the main problems.

The buildings from the plateau have different functions: two restaurants, two Kiosks the ticket selling pont for the castle and for the village museum.

There are two streets on the plateau: the bigger one which comes from the town and a secondary one which is only used as delivery access for the restaurant. These streets don't have any destination and don't offer any possibility to turn the car.

The plateau shows no qualities, only minus points. It is chaotic and unorganized. A parking lot is another element which is absent from the site.

4.2 The organisation of the castle

The castle has a concentric organization with three interior courts. In contrast the plateau has a rectangular form. In this moment both areas don't have any relation with one and other. The landscape is almost indiscernible even though it has a great potential. The entrance to the village museum is not visible and also not accessible direct from the plateau.

4.3 Development strategy. The integration of the castle plateau inside the castle area

The first stage of the development concerns the demolition of all the existing buildings. They were not created for the enhancement of the touristic qualities of the area but only for economical purposes.

The main idea is to take the same organization principle used in the castle area and to apply it to the plateau. In this way the plateau is organized like an circular enlargement of the fortress territory.

After the first series of circular extension a new design of the plateau emerges.

The second series of circular extension concern the creation of a parking lot and a new bus station.

Afterwards three different regions appear: the castle plateau, the area near the entrance to the castle and the parking lot. These three areas are adapted to the topography. In the places where the necessity exist, the height difference is covered through stairs and ramps.

The purpose of the project is the integration of the castle plateau in the castle area. For this reason an wall is built which enhances the medieval atmosphere given by the fortress. The wall consist of the same material as the castle and has a height of 1.5 meters.

The plateau is developed through a central axis. This central axis has at one end the new touristic center and at the other the entrance to the castle. These two important points give the distribution inside the plateau. The new designed alleys are axial related to the castle.

The new street system is organized exactly like in this scheme. The park alleys are directly bounded to the parking lot.

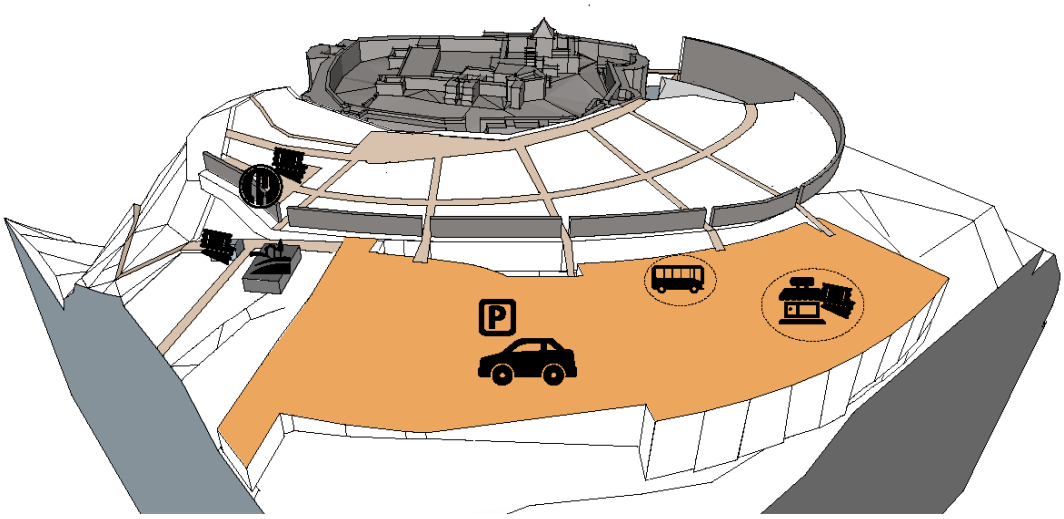

Fig 7. The final scheme for the castle plateau.

4.4 Results

As noticed before the concentric evolution is the main principle which dominates the development strategy. The new created wall is doubled in a region in order to allow a slower, easier, gradual passing from the plateau to the forest area.

The centers of the new emerged landscape composition are two belvedere points one here in the middle of the area and one near the castle entrance. The connection between these two points is made through a ramp and two sets of stairs. The new created parking lot keeps the concentric principle which controls the entire plateau. The bus stop is included into the western part of the parking place.

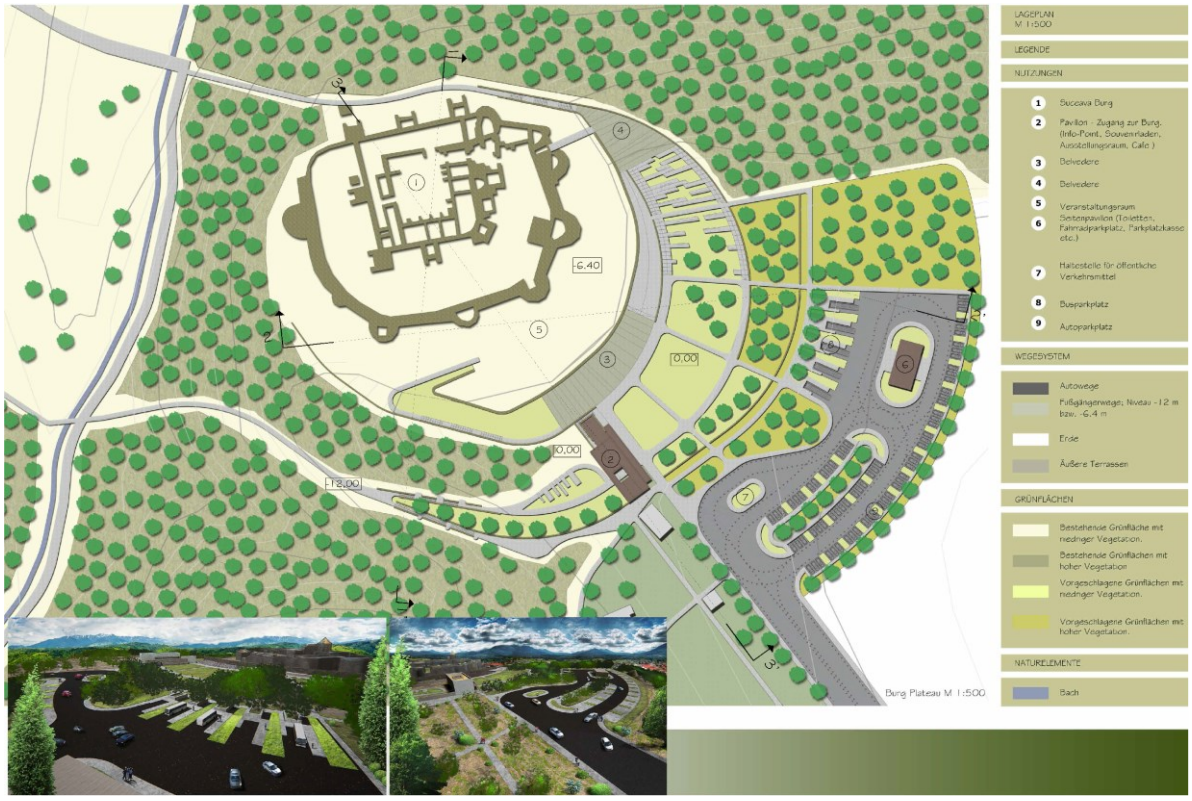

Fig 8. The resulting plan for the castle plateau.

5 TOURISTIC INFORMATION CENTER

5.1 Disposal on the site

The new information center building is located at the southern access into in the plateau from the forest. What is particular about it is the fact that the pedestrian way passes through the building attracting the tourists to go in and visit the permanent exhibition, to attend meetings, conferences or film projections or only to buy a ticket.

A secondary building is planned near the bus parking lot, with the role of retrieving a part of the functions from the main building.

5.2 Floor description

As mentioned above, the ground floor level serves for touristic and administration facilities. At this level the building is divided in two parts by the passing through alley: the left part is dedicated to the public and the right part contains the employees burros. The both parts have their own circulations and their own toilets.

The first floor keeps the basic organization of the ground floor, with a group of circulations dedicated to the employees and one for the visitors. The main function of this level is the cafeteria with the open air terrace. This terrace is also accessible from outside.

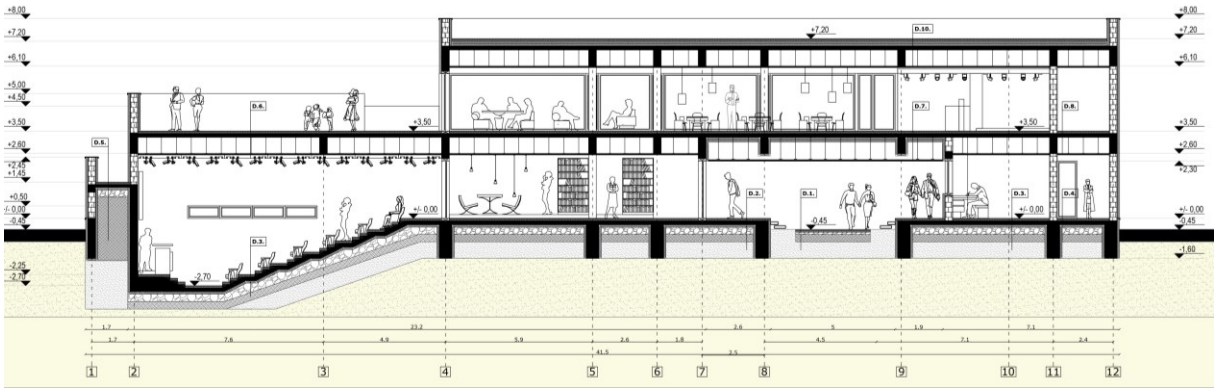

Fig 9. Main longitudinal section.

5.3 Particularities about the building

What is also worth mentioning is the fact that an atrium is planned above the pedestrian way in order to assure that the light comes into the alley.

The structural system of the building consist of concrete beams, columns and ceilings. The openings are done mainly through glass walls (cafeteria) or through small windows as a compulsory requirement for the conference room. The intention is to obtain a similar architectural language with the castle.

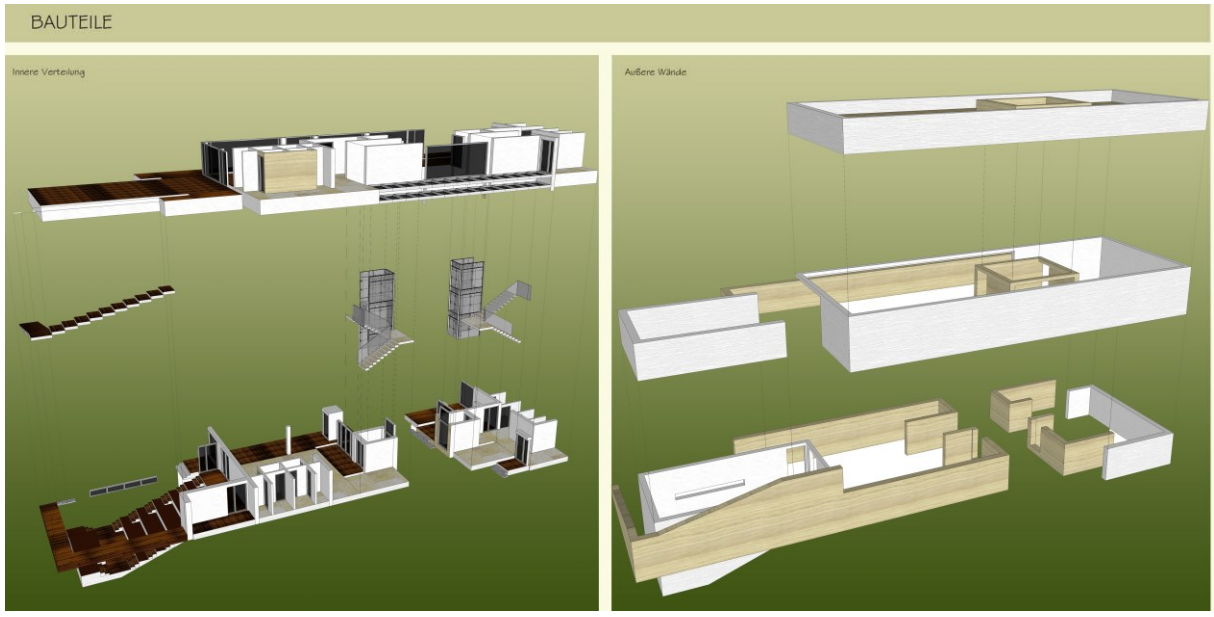

Fig. 10. The main parts of the new touristic information center.

6. CONCLUSIONS

Besides the practical requirements of the project one other purpose was to attract the foreigners attention to the potentials and the uniqueness of the area.

At the same time the project represents one good example of combining the modern way of thinking the space and the introduction of new ideas in a place which was shaped around 500 years ago.

Fig 11. Renderings of the entire plateau and of the proposed building.

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INMI Suceava Protected Area Study 2007.

BYZANTINE-STYLE DOMES IN WALLACHIA: ANALYSIS AND CASE STUDY

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The dome on drum, sustained by pendants, sheltering the image of the Panthocrator on the inside upper surface, is the symbol of the sacred space in the province of Wallachia, as it is, as a rule, in all Byzantine architecture.

Unfortunately, of all the historic churches in Wallachia, many have lost their domes because of the great earthquakes of the first part of the 19th century (1802 and 1839). Because of these losses, as well as for other degradation causes, they have constantly undergone repairs, modifications, completions and, in many cases, ample alterations of configuration and expression.

These kinds of interventions, of the second part of the 19th century, followed a quite typical scheme:

- If replaced, the lost domes were improvised, covered in tin on wooden structure. The worst part is that in general, their architectural quality is null, if not negative (with some exceptions: Dintr-o Zi church in Bucharest, Frunzăneşti, Negoeşti and few others).
- The windows of the churches were widened, the stone framings were taken off, the façade ornamental features were modified (often mutilated). The resulting image had a hybrid character, as the alterations were made in a rather poor architecture, vaguely classical or eclectic, with more of an under product character, rather than a provincial character.

The restorers have often chosen the first option (usually after ample analyses and discussions, which took place in the Commission for Historical Monuments). The works of Horia Teodoru (Curtea Veche church and others), of Ştefan Balş (Kreţulescu church and many others), are major examples for a series of many works, undertaken from the 40's until the 70's of the 20th century.

On the other hand, it can be considered that the general image of the 19th century religious architecture in Wallachia does not suffer serious losses because of these interventions. Whatever we may think of the value this architectural category has, it is rather widely represented through churches of this period, fairly numerous and more characteristic in general, better handled than the ones of prior periods, modified as shown before.

1. EXAMPLES FROM OUR WORKS

The restoration projects and works for the churches of the Plătăreşti monastery, Ilfov County, Berislăveşti hermitage, Vâlcea County, the Verneşti village, Buzău county, the Plăviceni monastery, Teleorman County, now in different stages of study and making, represent some of the cases we have mentioned. They date back to the 17th and 18th century and they have suffered losses and alterations of the type sketched above. The restoration interventions were started out of major conservation motives: their critical physical state, both structurally and as

a climatic protection. The loss of the integrity of the churches implies as well the danger of losing the paintings, extremely valuable in these cases.

The reason for a restoration intervention should not be to adjust the image, to beautify, or to achieve similar constructive actions but the necessity of physically conserve a historical monument in the integrity of its substance.

When intervention is necessary, it's obvious that besides the rescue, conservation and integrity solutions, another problematic comes up many times: that of the restoration plan, of choosing the components and characteristics to be conserved, of the ones to be reintegrated and of the ones that simply cannot be conserved due to various reasons, and that are to be removed.

For the four cases mentioned I have proposed the reconstruction of the lost domes, on the basis of definite facts: the bases of the preserved drums, existing remains, images on the votive paintings.

The elements that could not be reconstituted entirely based on facts, have been established as a result of studies that have started to review the analogy with comparable items stored in the cases of other churches of close age and typology. The vertical configuration of the towers, from the overall proportion all the way to the details, especially at the top, usually represents such an item.

The image of the votive painting of the church, a possible source of information, is not a metric representation; anyway it is not an orthogonal projection. The painter had not sought to the image as a document, but a state of mind, an expression; he had no systematic knowledge of geometric representation nor wished to refer to geometry.

An important tool possible to be used to understand and judge more completely and more accurately the real image in space, before its concrete existence, is by virtual computer aided modelling.

These virtual graphic documents are not just purpose in itself, but they are also support for studies and projects that become professional reality. They are as well useful study material for students.

There is still much to do to in order to achieve a coherent virtual museum of historical architecture in Romania; but there are increasingly more items dedicated to the topic.

2. THE DOME-ON-DRUM OF THE CHURCH IN PLĂTĂREŞTI: FROM STUDY AND PROJECT, TO MAKING

The subject of the study case is the *St. Mercurie* church of the Plătăreşti monastery, 30 km away from Bucharest.

The dome proposed in the Plătăreşti project had already been approved before we began the work in site, we raised the scaffolding on the church, and we got the possibility of making systematic surveys. The discussions in the National Historic Monuments Commission were complicated. The regretted professor Grigore Ionescu, then Chairman of the Commission, said: "we have to return to the original configuration, we cannot have the 17th and the 19th century at the same time"; further he said (I can still hear him now in my mind): "allow the architect to do his job!".

The construction started and then I was able to climb the scaffolding, to carefully remove the

“parasite” masonry (added in the 19th century) and find the original tower’s column foundations. We found the first brick horizontal layer of each column of the original drum, with the precise configuration of the horizontal section.

It was confirmed that the tower had 12 sides; we saw clearly that the vertical sides of the columns, namely those in successive withdrawals, were radial and not parallel.

I already assumed that I could find such a configuration, as I had previously seen in a long article of the architect Horia Teodoru in BCMI (Buletinul Comisiunii Monumentelor Istorice, Bulletin of the Comission for Historical Monuments,old series, no. 113-114, July-October 1942); here, a study on the dome-on-drum of the old church Flămânda of Campulung Muscel was presented, with a perspective restitution. The church no longer existed, it had already been demolished, and Horia Teodoru had undergone the study based on a remaining photograph.

Not only a great architect restorer (St. Anton Church – Curtea Veche, in Bucharest, and others), Teodoru was also a professor of Perspective at the School of Architecture. By him, we have a book on perspective, very comprehensive, systematic and accessible.

Returning to the article, the author describes three types of drum configurations: polygonal, circular-polygonal and cylindrical.

The Flămânda church dome on drum, which is the subject of Horia Teodoru´s study, was of circular-angled type; the withdrawn faces of the vertical pillars which are not in parallel plans, as in the polygonal pattern, but in radial plans, converging to the central axis of the tower. The archways that are born on these pillars are not in the shape of cylindrical arcs, but truncated cone arcs. These arches are developed on a series of virtual conical surfaces, actually some horizontal cones halves, all converging to the axis of the tower, at the springing of the dome. The archways, the "brows" of the tower, look up, open like spatial fans, toward the sky, unlike the cylindrical archways.

Considering the data we have so far, this type of configuration is typical for the church architecture of Wallachia. If it is indeed so, it may be proven as a result of comparative studies, studies that are to be done in the future.

When I found and studied this article, I could have not known yet what type the tower of Plătăreşti was, especially because Plătăreşti (1646) is over a century older than Flămânda (1765); but I already had a systematic base of the geometrical analysis.

For several years already I had been trying to observe existing towers as close as possible, some original (based on the existing information), some reconstituted after professional restoration works (Kretulescu in Bucharest, Brebu, Prahova County, and others). I tried to understand precisely the configurations, by direct observation after measurement drawings or project elements that we could find, after 1990, in the reconstituted archive of the Department of Historical Monuments on Ienăchiţă Văcărescu Street. The study of Horia Teodoru was the clearest tool of analysis of all.

The pillar foundations of the drum of Plătăreşti, which I found through the survey that I mentioned above, were clearly radial-configured; I now had the exact geometric configuration of the drum, with some small variables: the exact height of the drum (of all pillars) and the exact number of rows in the cornice of the dome. The number of the angular brick arches, that

represent the "brows" of the archways, was certainly three, because the pillars have three successive withdrawals.

We set the height of the drum after making a comparative study on as many examples of related types as possible. The most similar example I found to be Gura Motrului, of the same period as Plătăreşti, which very likely keeps the original domes.

As for the crown cornice of the dome, I have determined that it most likely had three rows, as I also found both on the main body of the church, and at the base of the drum: the remains of the primitive angular bricks in successive cantilevered horizontal layers. The latter were broken during the 19th century intervention and then covered with drawn profiles, with a vaguely neo-classical character, but the remains still existing shown clearly the original configuration, by the sizes and the characteristics, which can be identified very clearly by examining the broken debris of the cantilevered bricks, remaining in the wall masses.

I now had the tower configuration, a complex one, subtle and refined.

But if I was to reconstitute this configuration, I had an even bigger problem: how could some masons in the 1990s be able to understand the geometric relations, even from the greatest drawings? And then transform them into reality, bricks and mortar?

I then proposed that a group of students make the 1/1 scale model of one of the 12 arches of one arcade. We also made real-size models of the casings on which the arches were to be built. The casings were made out of thick packaging cardboard and the real-size bricks, of expanded polystyrene: regular bricks, rectangular, about 28 x 14 x 4.5 cm (nominal 30 x 15); special-shaped bricks (angular), with a 12 cm wide semi-convex profile; 60-degree angled bricks, 12 cm wide as well; the "tails" that narrow like a trapeze, that are to be placed in the truncated cone archways, and make the fan-like turn around the corners, at the horizontal cornice of the crowning. All the brick shapes were identical to witness that we had the luck (and care) to seek and find on the site.

It is clear that if you make a sided horizontal-layered radial arch, out of parallelepiped pieces such as bricks in general, the mortar between the bricks should have a variable thickness on the ray direction. Moreover, if the arch has a truncated-cone shape, and not a cylindrical one, the space necessary for the mortar will have a variable thickness in the direction of the arch depth as well. It took a very precise marking of these varying sizes on these two directions in space.

The execution contractor (S.C. DEDAL BAHAMAT from Galaţi) took our board casings and re-made them out of wood with tin truncated-cone surfaces, in two copies, and they brought them to the restoration site.

I had asked the craftsmen to stop the work when they got to the level where the pillars were to support the arches, and then I came with the students and the model, and we installed it; at first, the masons looked at us surprised, but had it clear when they saw it done, and slowly began to build along the first true arch. It came out perfectly, and then the other 11 as well, one by one. The main craftsman, had told me, before seeing the model, that it is not possible to aside the bricks "the way I want, in the shape of a fan or a dove tale”. After making it from the model, he said: "This is a sculpture, sir - and we did it." It was one of the most beautiful

achievements we had had before with the craftsmen, under many difficulties and critical moments. This happened in 1994-95.

Since then I've made some domes reconstitutions, in projects, for the churches in Verneşti, Buzau County, Plăviceni, Teleorman County and Berislăveşti, Vâlcea County.

For these topics, I did not have such clear witnesses as in Plătăreşti; I have not found any elements of the original towers. Even their foundations were lost, at least the upper parts (at Berislăveşti) or even entirely (in Verneşti and Plăviceni). Instead, I found votive paintings, which in Plătăreşti we did not have. In these cases we opted for the reintegration of the church volumes by restoring the towers on light wooden structures, and mortar surfaces on lightweight support.

3. EXAMPLES

3.1. The church of the Plăviceni monastery, Teleorman County, the 19th century

Plăviceni is a monastery that was abandoned in the 19th century, and became a ruin.

The ruins were partially consolidated and reconstituted at the level of the main body. This time, the tower was made on a light wooden structure.

3.2. The Church of Verneşti, Buzau County, the 19th century

The dome of the church of Verneşti is actually a bell-tower over the narthex. As supporting elements of the volumetric reintegration plan, I had the certainty of the existence of the tower – a bell-tower at its origin, proven by the existence of the staircase , in the thickness of the wall; it was also represented in the votive painting, which I found hidden under later paintings.

As a conclusion,the itinerary through the geometry of Byzantine Wallachian domes becomes more fascinating while being connected to an unmediated, direct experience of vision.

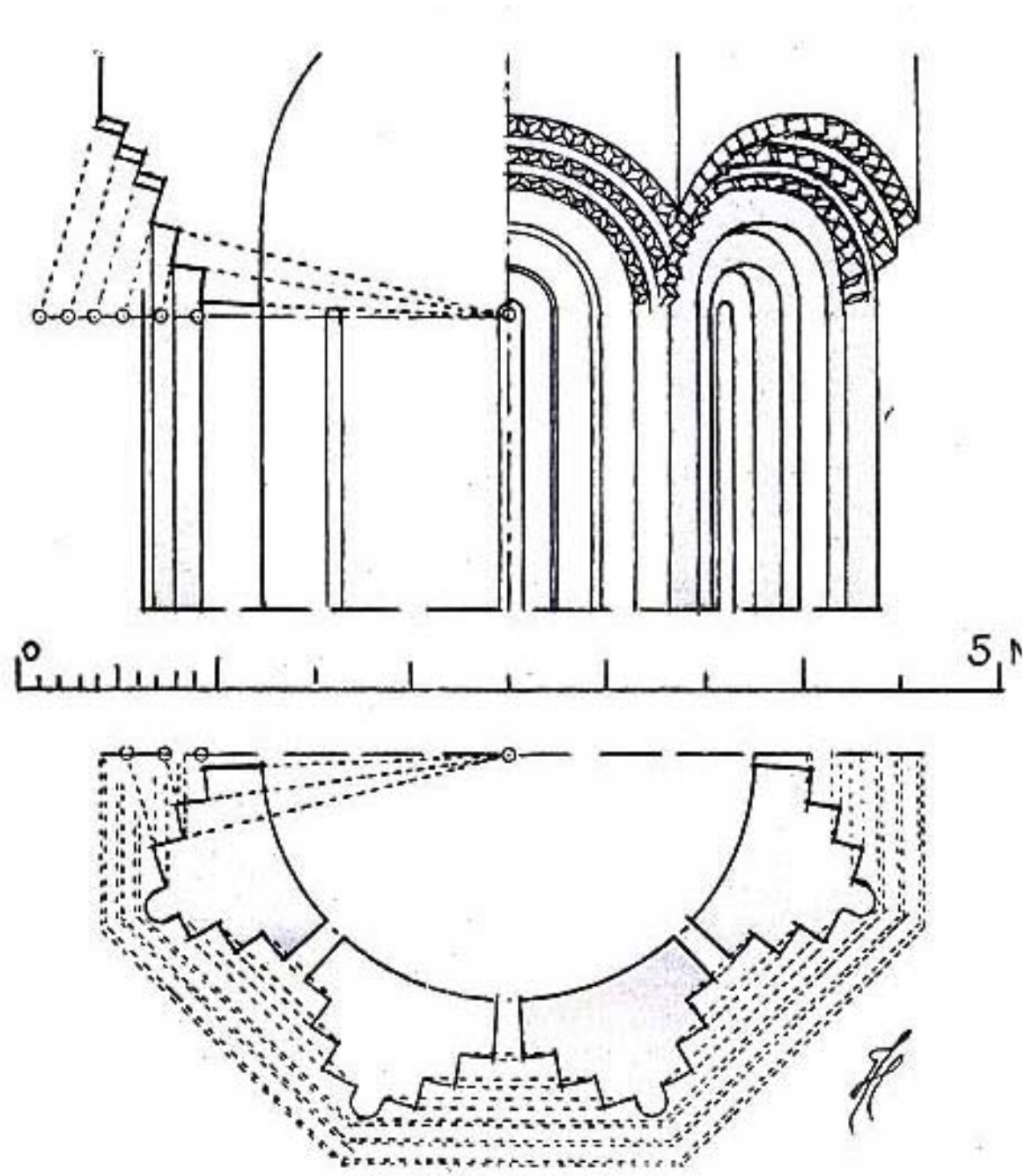
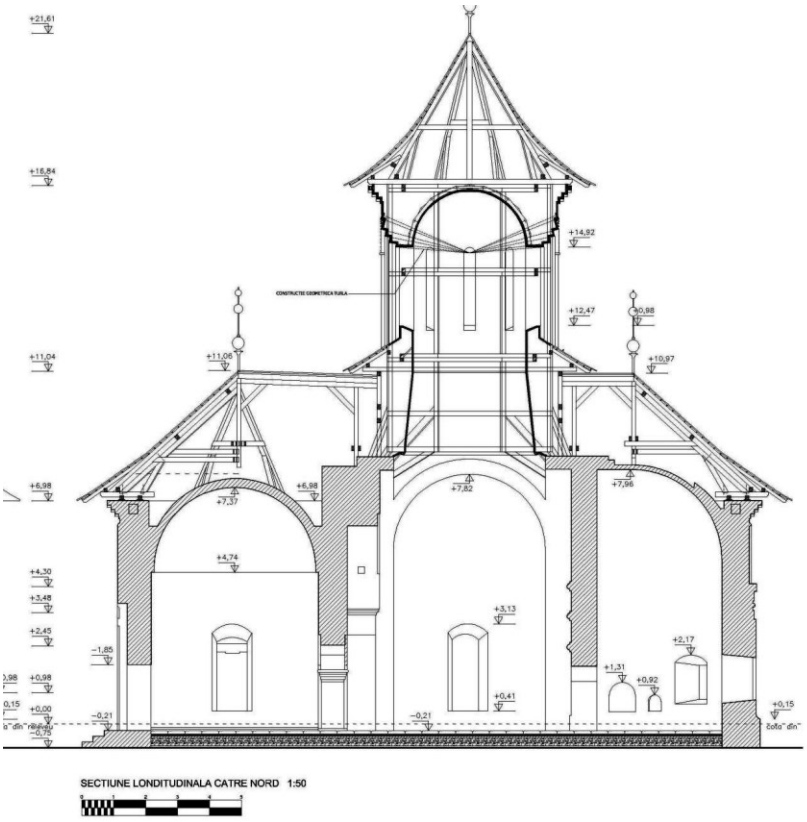


Fig. 8. — Turla circularo-poligonală.

Fig. 1: Horia Teodoru,. „Biserica schitului Mărculeşti-Flămânda din Câmpulung-Muscel, studiu arhitectonic”. BCMI nr. 113-114, iulie-octombrie 1942, perspective restitution of the drum, plan and cross section



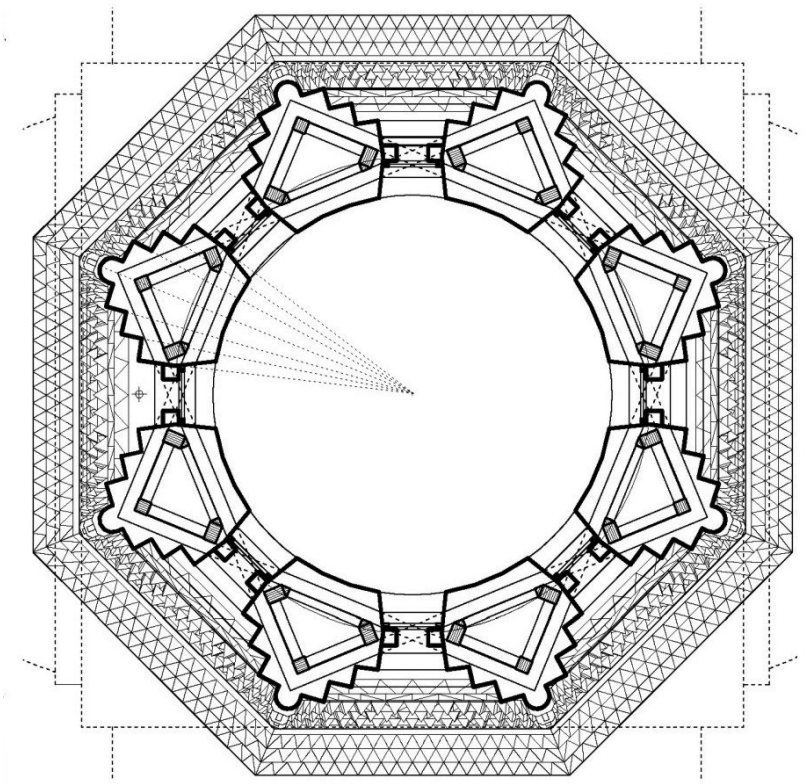


Fig. 2: Plaviceni, project, plan of the drum and cross section of the church

Fig. 3: Scale 1/1 model of an arcade for the reconstruction of the drum and dome on the church in Berislavesti, front view

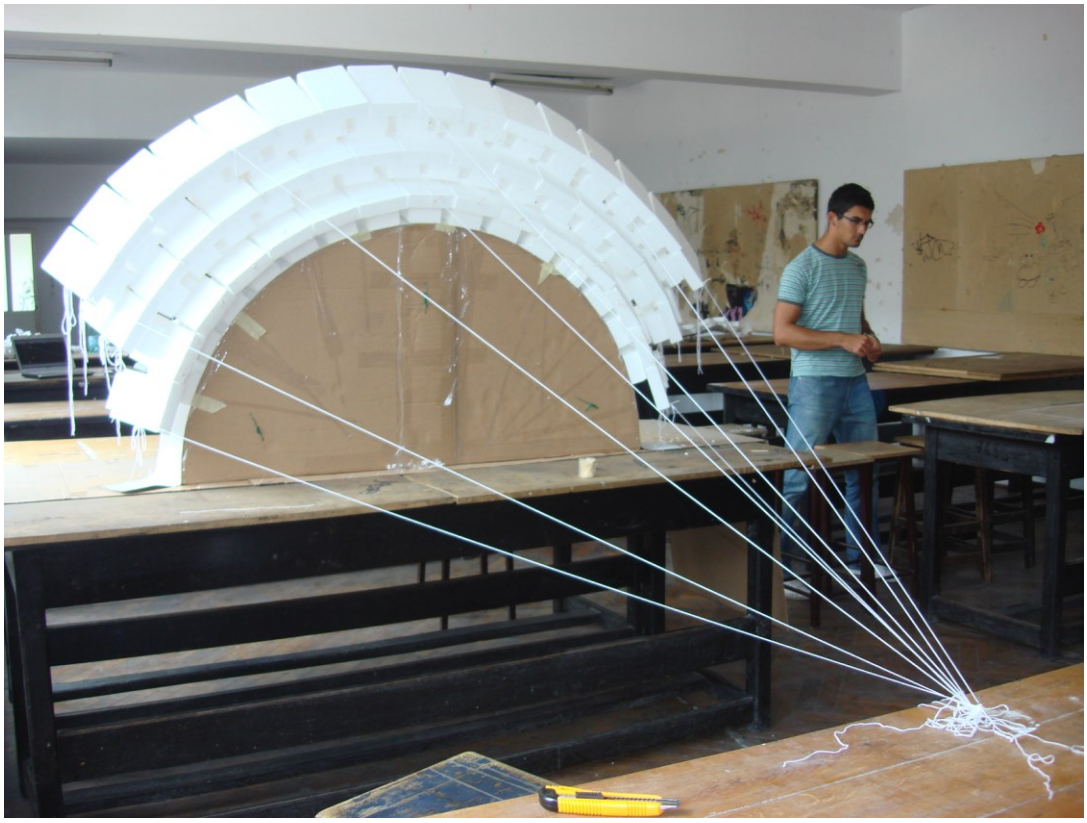


Fig. 4: Scale 1/1 model of an arcade for the reconstruction of the drum and dome on the church in Berislavesti, back view with radial configuration suggested with strings

Fig. 5: Plataresti, dome-on-drum reconstructed

Fig. 5: Plataresti, arcade above drum in construction

Fig. 6: Domes of Hurezi, main church and chapel

Fig. 7: Dome of Hurezi, the Pantocrator

THE AESTHETICS OF ENERGY EFFICIENT BUILDINGS

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Genuine poetry can communicate before it is understood. T. S. Eliot

Abstract

In this paper the authors intend to discuss contemporary issues regarding the notion of energy efficient buildings from a different standpoint - that of aesthetics.

Firstly, it is wise to admit that we are discussing terms from very different spectrums of the built environment. Aesthetics is a qualitative field and energy efficiency is a quantitative field. These are two ways in which we can interpret a building's success, or two ways in which a design can fail. Alas, those terms must collide when we are discussing contemporary buildings.

One of the disputed aspects about energy efficient buildings is that they are ugly, lacking the common traits of formal beauty. The problem is an old one - that of placing objects in categories. Some energy efficient buildings tend to defy generalization, they are foreign when compared to other buildings, but familiar when compared to examples in nature.

Today's buildings are one of the main factors attributed to global warming, because of their excessive usage of energy and natural resources. Environmental ethics is a subject of growing concern, among many fields, including architecture[1]. The green building's movement proved that is much more than a fad, special concern about energy efficiency being integrated is many contemporary building designs. The challenge is to build architecture that is both beautiful and energy efficient. Sustainable architecture represents more than the sum of its parts, is about quality, considered from different standpoints: social, aesthetic, technical, economic, or environmental.

In which particular way are they different looking from other buildings? How can we spot an energy efficient building?

It used to be easier. In their beginning, energy efficient buildings used to have all sorts of "crazy" features and add-ons that make them easy to be recognized as such. Such features included, but were not limited to rooftop planting, photovoltaic panels, thermo siphons, Trombe walls, Barra systems, double envelope/shell house, thermal buffer zone, solar space heating system, solar chimneys, solar cooling tower, wind catchers, earth sheltering, etc. Evidently, all these features and add-ons depended on the site's conditions and the area's climate.

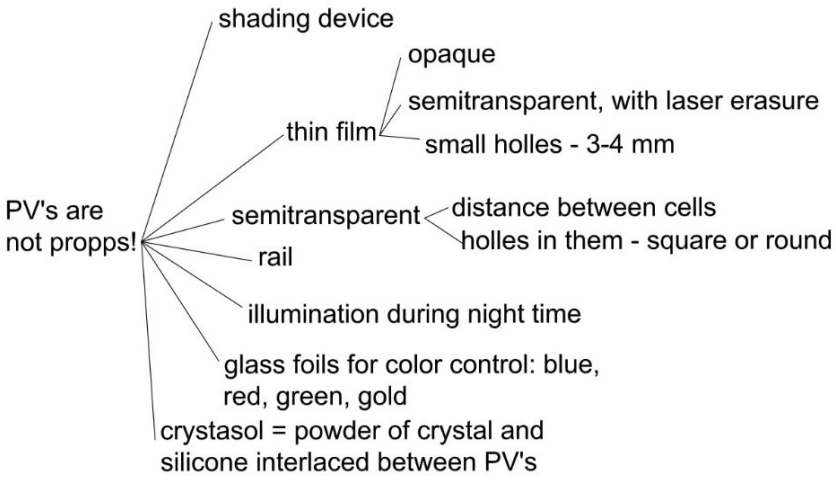
Today, as energy efficiency becomes an issue of growing concern, energy efficient buildings (or at least buildings with energy efficient features) are growing harder to identify. This is due to both technological advances and the dissemination of knowledge between specialists, and architects in particular. They tend to be better integrated in their surroundings, many taking

[1]http://onlinelibrary.wiley.com/doi/10.1111/j.0031-806X.2004.00167.x/abstract

passive approaches towards energy efficiency: clustered rooms, buffer zones like wind-fangs or greenhouses.

All architectural products have taken a more global character, but energy efficient buildings tend to adapt to their environment. This is part of the problem in identifying them - there are not 2 alike, they transform, much like living organisms, adapting to the environment. Architectural practice is great at playing the imitation game, but energy efficient buildings are harder to emulate, because of their adaptive nature – what works great in one environment, it may not work in another as well.

There are different approaches in using energy efficient features in building designs - add-ons and integration of energy efficient technologies. There is a growing demand for renewable energy systems that can be integrated on to buildings in ways that deliver both technical and visual performance. A great example in how technology manages to keep up with aesthetical demands in buildings designs is provided by new developments in the photovoltaic panels state of the art (PV's) (fig. 1).



What is the taxonomy of energy efficient buildings?

Energy efficient buildings are difficult to describe in a taxonomical way, and the current state of EPBD Recast's adaptation in the different member states of the European Union is proof of that. Across Europe are defined a variety of concepts and voluntary standards for highly energy-efficient buildings or neutral buildings: bioclimatic buildings, passive houses, zero energy buildings, 3 liter buildings, positive energy buildings, active houses, etc.. These definitions relate to different fields: the energy obtained on site, the source of energy costs or emissions. In defining buildings there may be variations in the standards when they are considered new or existing buildings, residential or non-residential. This plethora of energy efficient buildings is normal considering all the different climate and cultural conditions they have to address.

Most energy efficient buildings have an aesthetics of their own, meaning that they have some kind of separate code, or criteria by which they can and should be judged, different from the mainstream. Like in vernacular architecture, their beauty derives from order, and from acknowledging the context - both in the natural and the anthropic form. Vernacular architecture is developed over a long period of time, reflecting the cultural and environmental conditions of a particular setting. Bioclimatism plays an essential role within vernacular buildings, highlighting the importance of understanding local conditions. Also, energy efficient buildings tend to derive their inspiration from nature, either by adapting or mimicking.

Bionic architecture lies between the fields of ecology and sustainable architecture.

Nature offers architecture, through bionics examples that can lead to a sustainable built environment; that's why bionic architecture and ecology – science that studies relationship between living organism and their environment, depend one to another. Bionic architecture also is interconnected with sustainable architecture – relation between constructions, build and natural environments. That's how there is no real difference between sustainable buildings and the ecologic ones, and just a difference of perspective and interpretation of the relations to the environment. Sustainable buildings aim to reduce the edifice's negative impact to the environment, and ecologic buildings aim to increase benefits regarding environment. Architects, designers and biologists study and imitate living organisms' and ecosystems' shapes and processes/ behaviors and transpose them to ambitious projects that predict the next industrial revolution.

All energy efficient buildings aim for a common trait - homeostatic control[2]. This, in a way, brings them closer to the archetypal state, in which man builds to separate himself from the harshness of the environment. Different aspects have a greater impact in designing energy efficient buildings then in regular designs: orientation (and envelope differentiation), compactness, climate adaptation, building materials, on site renewable energy potential. Different climate regions/zones provide different challenges and opportunities for energy efficient buildings. Every location has its own specific climate and resources, and that potential has to be detected and used.

The latest discoveries of science and technology have had a large impact in the architectural field by building new bonds between man and the environment.

The connection that man shares with nature by adapting to the environment, without exhausting its resources, makes possible the link between architecture as an anthropogenic environment and nature as a model generator of architecture. Thus started projects that enhances the architectural potential of nature, whether it is about constructions made by living creatures, or models inspired from plants' structures.

Nature becomes an architect that shows us how to create in its own spirit, judging by its laws.

The relationship between the natural environment and the built one is dependent on man's view regarding nature in a specific historical timeframe.

[2] The homeostasis terminology in biology refers to a life system parameter, where organisms maintain a constant condition, acting as conformers or regulators. http://en.wikipedia.org/wiki/Homeostasis

Sustainable development is a concept that must be understood in close relation to the protection and preservation of the environment, the issues of global warming and pollution.

Ecological architecture must reflect the aesthetic adequacy, cultural coherency, respect for the urban or landscape context, respect for the past, concern for present and conservation for the future, all seen from a regional standpoint. Architecture most concord not only with our current way of life but also with an idealized one.

Keywords: energy efficient buildings, aesthetics, nature, sustainability, architecture, desig

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SITE IN SIGHT

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Abstract

The purpose of this paper is to outline the relationship between current trends in landscape architecture and the methods of representation used by landscape architects. Landscape architects materialize ideas on physical supports in order to discover new possibilities and to convey the atmosphere and character of a place – how an individual user will experience the future landscape, for the purposes of marketing. Current trends in landscape representation are intended to evoke mood and atmosphere rather than literal views. They call for a form of representation which is visually succinct, allowing an almost instant impression, and at the same time suitably vague. These trends are represented primarily by means of the eye-level perspective, image saturation, transparency, blurry images and tendency of landscape architecture imagery to be used for story-telling rather than the construction of actual projects.

The representation aims to create an almost instant response, trigger emotional engagement and give the viewer the impression of understanding the entire project within seconds. The paper purpose is to show that current trends in landscape representation are not to assume that artitself depends on computer assisted design and neither that we should preserve classical patterns of representation but to evolve and benefit of this new technology.

Keywords: Visual representation, graphic design, current trends, methods of representation

1 INTRODUCTION

For a long period of time, drawing instruments such as pens, pencils, watercolors etc. have been the main tools of representation for landscape architects. Nowadays, these instruments have been substituted by Computer-aided design. Despite the fact that a landscape is basically constituted out of water, earth, plants, light, etc. the design process takes place in a completely different zone. This zone acts like an intermediary between our thoughts and reality. We call this zone drawing. Therefore the creative access to `real` landscape is remote and indirect, unraveling in a two dimensional plane (paper, screen) or a three dimensional plane (models). Granting all this, visual representation remains the best method of presenting a project, an idea, an emotion, a solution for landscape architecture projects. Just as the design itself has to be up to date, the graphic deviced used to express it must be, too. Thus graphic visualization is an important part in the design process. In keeping with curent trends in design, the graphic devices used to represent it has become a powerfull tool in visual representation. In this form, digital tools should become an extension of an idea, of a thought. Based on my own work and passion for graphic design, I decided to write this article. The richness of ideas presented by landscape architects should be conveyed in a proper manner. The ability to communicate an idea takes place through images. These images are not supposed to lead the idea but to be a form of communication between audience and the originator of the project.

2 METHODOLOGY

We all agree that a visual represenation of any kind is supperior to any text in terms of understanding an idea. This type of representation is superior to text mainly because it makes it possible to understand the project all over the world, regardless of language. Illustrations are the main language used by landscape arhitects to represent atmosphere, thoughts, ideas etc. In any visual representation can be found a personal expression of those involved. Senses are our means to experience and understand a space. We came to understand the world by our sences: sight, hearing, smelling, taste and touch. A visual representation can per se reach only the sense of sight, and yet the ambition must be for the sounds, smells, materials revealed in a visual representation to be understood in an attempt to convay the desired athmosphere in order to make a statement and trigger the desired emotion. In principle, a student learns to use this instruments in its first year, but in fact a mature illustration must define and control the relation between images and the design ideas. The relation between an image and the design idea can only be controled and defined by a landscape arhitect, as the originator of the idea. This sections consists of three subsections: the landscape zones – a presentation of the three main phenomena that charcterizes a landscape; methods of representation – a description of the basic methods of represenataion and how they are used and technical means of represenation – a dispaly in curent trends in landscape visualization.

2.1 The landscape zones

One of the greatest difficulties in landscape representation is to evoke and experience a place. According to Simon Swaffield[1]: "In particular, there are three phenomena unique to the medium of landscape and the experience of the same that evade reproduction in other art forms and pose the greatest difficulty for landscape architectural drawing. These may be tentatively called landscape spatiality, landscape temporality, and landscape materiality." The purpose of the section is to understand that an image will never substitute an actual landscape experience and maybe it shouldn't.

2.1.1 Spatiality

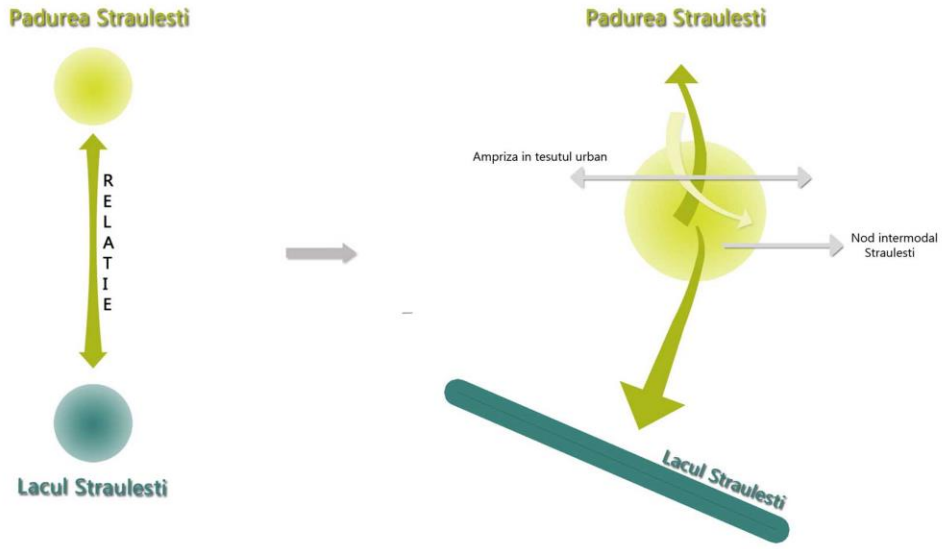
The landscape surrounding us has no boundaries. The abundance of landscape spatial experience cannot be represented without alteration or reduction. Every place is unique and special. There is a cooperation between different places in order to create a whole. The experience of landscape space is never simply and alone. Our world is created as a network of relations and associations. We function as a system. An image could never substitute this but we can try to underline a relation (fig. 1), an element and that is what current trends in landscape architecture are trying to achieve.

2.1.2 Temporality

Every experience has a duration, an unfolding flow of before and afters. In the same manner as a landscape cannot be manufactured spatially it also cannot be reproduced temporally. Modern technology has the means to present a successions of events by film making but this also could never be experienced as in reality.

2.1.3 Materiality

The materiality of an object can only be experienced by touch. However an image can be used in order to trigger a memory to take a race back in time when that thing was experienced.



"Fig. 1 – Relation. Source: Eftime Andrada, Project – The link of two natural elements: Străulești Forest and Străulești Lake"

2.2 Methods of representation

Current trends in landscape visualization are not trying to present an actual image but to convey an atmosphere. There are three basics methods of representation which are used worldwide: two-dimensional representation, three-dimensional representation and time as a fourth dimension.

2.2.1 Two-dimensional representation

In landscape architecture, two-dimensional drawings are vertical or horizontal parallel projections. The purpose for this method of representation is orientation. There are many types of two dimensional drawings such as ground plans, sections, elevations, diagrams etc. Ground plans are suitable for representing the existing terrain, analysing it at the initial stage.

It should always be complemented by a section or an elevation. Diagrams are used for illustrating the design ideas or a specific part. This sectional views can never be experienced in reality as they are presented. They are percived as an abstract language used by trained people and will never have the same impact on an large audience as a three-dimensional representaion or as a film. Nevertheless they are an important part in any project and they are the basic instruments in controlling a space.

2.2.2 Three-dimensional representation

Three-dimensional drawings are used at a large scale and they appeal to a large audience. Images are a form of representation aiming to create an almost instant response. They are visually succinct and their biggest quality is that they can be understood within seconds. These form of representation can be manipulated by different technical means of representation. Their purpose should be to convey an atmosphere, rather than an actual image.

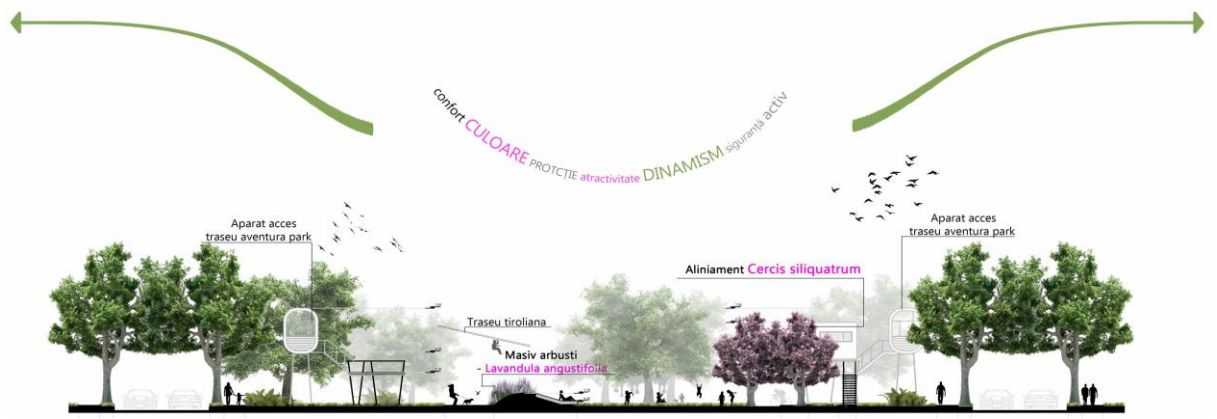
Current trends in landscape architecture are focusing on fairy tale images in an attempt to make a statement. These images sell a felling and not a project.

2.2.3 Time as a fourth dimension

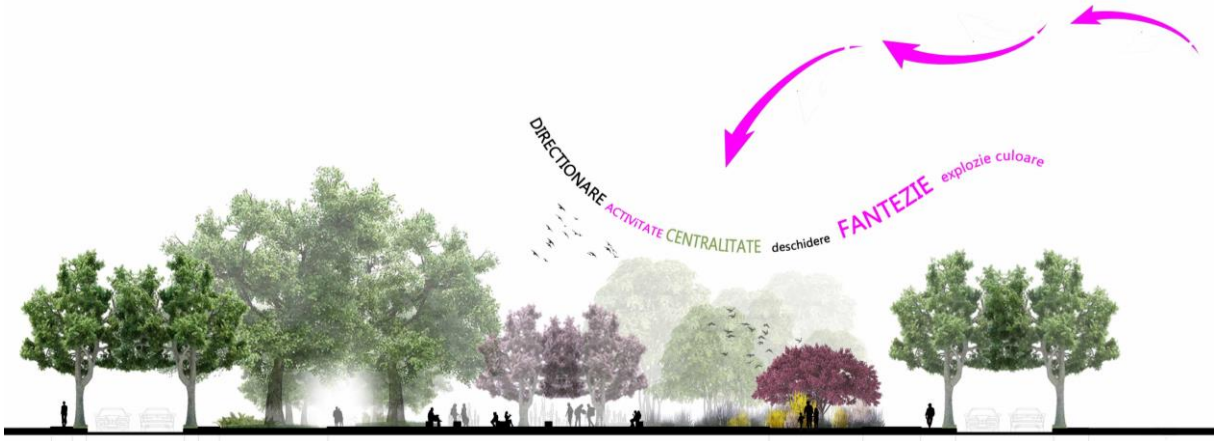
Thanks to modern technology, it has become easier to represent time as a fourth dimension. Nowadays creating a film has become much easier and is used at a large scale by landscape firms. These films are presented in numerous ways in the forms of walks, drives or flights through over the planned landscape. They envision a space in which days are passing, seasons are changing etc. In general they are presented on a screen which is bidimensional but they can also be experienced in 3d. Introducing a third dimension is a big step in nowadays technology but it isn`t the same as reality. Nevertheless they can help urban planners, landscape architects and also the people who experience a place to understand the project better. Landscape architects work for the future and modern technology can help speculate about a future reality.

2.3 Technical means of representation

There are several technical means of representation which include representing figures as shadowy or out of focus, image animation by presenting typically photographs of human figures involved in the desired activities (fig. 2, fig. 3), unusual viewing angle (fig. 4), by representing figures as shadowy or out of focus etc. In general the effect of the surrounding buildings is more powerful than that of plants. Mainly to provide a framework and scale for the open space presented. Plant species are not clearly identified in order to create the atmosphere desired.



"Fig. 2 – Section. Source: Eftime Andrada, Project – The link of two natural elements: Străulești Forest and Străulești Lake"



"Fig. 3 – Section. Source: Eftime Andrada, Project – The link of two natural elements: Străulești Forest and Străulești Lake"

"Fig. 4 – Section. Source: Weiss/Manfredi, Project – Yongsan National Urban Park Master Plan"

3 CONCLUSIONS

Using computer assisted design has largely taken over from the hand drawings that used to be found exclusively. Nevertheless this two types of graphic designs should not necessarily exclude one another. A projects starts by using hand drawings and should be presented in an image that can communicate the wide perspective, both in terms of space and time. Using computer has largely contribute in a peculiar manner to the whole process of discovery and presenting a project. A mature computer presentation can be very diverse and has it`s own individuality.

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INSTANT ILLUMINATION AND FORTUITOUS DISCOVERIES – SKETCHING IN THE DIGITAL ERA

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Abstract

Sketches are traditionally the way architects externalize visual thinking in the process of design, continuously refining their ideas through the dialogue with the drawing. Sketches suppose hand movements and drawing media. Some authors [1] [2] may include also in a wider understanding of sketching, as a way of testing solutions, the possible use of other tools than drawing (for example physical models) In this paper, sketches will be referred to as sub categories of drawing.

The contemporary development of computer software has induced obvious changes in the way architects work, making some researchers question the use of sketches. This paper aims to clarify the part that sketching still plays in the process of architectural design, summarizing the multiple tasks it fulfills as a means of not only visual but embodied thinking.

Keywords: Sketching, visual thinking, ambiguity , empathic thinking, embodied thought.

1. METHODOLOGY

Numerous researches have been conducted, involving the observation of similar problem solving tasks (architectural program, design brief) through different methods. Due to the important degree of subjectivity present in architectural design ,resulting from it`s artistic components, it is practically impossible to arrive at a perfectly balanced starting point . The same architect/student cannot solve the same program for the first time with different methods . Comparisons between working methods (hand sketch versus computer modeling) are therefore always slightly biased by the inherent personal differences . Of course repetition of the experiment or a growing number of case studies leads to consistent and trustworthy results.

In this research I opted for the analysis of contemporary and modernist architect`s sketches, trying to find common denominators and deduct creative patterns. The study of the architects` writings concerning their phases of creative design is also used to reinforce the conclusions of the study.

2. STATE OF THE ART – MOTIVATION

The contemporary discussion on the question of hand drawing versus computer generated images (extending also to architectural creation as complete process) is certainly one of the most interesting subjects in architectural research,. Usually the authors tend to favor one of the methods advocating for the primacy of drawing/ sketching at least in the initial phases of design [3] or even as a representational tool [4] while some adepts of computer assisted design are convinced that the computer is much more than a tool, being able to generate complex architectural solutions [5]. Some authors focus on representational techniques [6] [2], others emphasize the stages of visual thinking as appearing in sketching [7] or in their transposition in computer aided design [8].

In the last 20 years we have witnessed a continuous progress of architectural software. The introduction of free form modelers , then the use of coding software for design offered the freedom to create an unlimited variety of surfaces and provided a form generating tool that allowed a new approach to design. Incorporating a wide range of data, computational software assures simultaneously the buildability of form and its compliance with a variety of requirements. It is obvious that the use of computer modeling opens new horizons to the elaboration of forms and structures that reflect the technology and spirit of our times. Many architects therefore use the

computer from the initial phases of design. Sketching tends to become an optional and maybe outdated skill. However due to its multiple and evanescent qualities sketching remains an unparalleled way of giving form to our thought.

3. EXTERNALIZING VISUAL THINKING

By sketching we express our thought externally, examining and reinterpreting it in a continuous process of evaluation. The role of initial drawings in architecture is not necessarily to shape form but to facilitate the relationships between imagination, memory and thinking. Sketching incorporates our subjective experience and, through externalizing, enhances our capacities of visual thinking. These observations apply particularly to one category of sketching , the so called "*thinking sketch*". Idea generation and diagramming (as a creative tool not as a representation of processes in the final building) belong to the upper mentioned category.
As they express our capacities of subjective interpretation even observational drawings and working drawings are superior to their photographic or computerized counterparts. The first one through its analytical and personal ordering of external reality, and the second through the rendering of materiality in building details.
In fact all types of sketching are linked to our empathic understanding of reality relating to more levels of being than the simple logic of visualization and incorporating a type of diffuse, emotional data impossible to render in an ideal algorithmic pattern.

3.1 Types of sketching and characteristics of the sketch

There are several classifications of sketches. The most well known is perhaps Ferguson`s (1992)[9](referring to drawing in engineering but often quoted and used as a classification in design ) , identifying the categories of : thinking sketch – supporting the designer`s thinking; talking sketch - communication vehicle in discussions, and prescriptive sketch –referring to specifications concerning the designed object. Gabriela Goldschmidt [10] compares the first two categories to literary drafts due to the way they are used in the development and revision of design proposals. Richard Hare [11] includes in the categories of sketching as a subset of drawing the following categories: observational drawing, idea generation, diagramming, design working and doodling. Do and Gross [12] insist on the difference between sketching and diagramming, accepting in the same time that in the architect`s creative process both are intertwined in an inextricable way. The diagrams describing processes and flows have always some spatial component and sketches present at least spatial relationships, often emphasizing diagrammatic components as circulation, interior exterior relationship, etc. Figure1, illustrates this mixing of diagrammatic and formal components. The diagram drawing of Michael Rotondi (figure 1)shows the existence of "proto-forms" of design easily recognizable in the final architectural object .

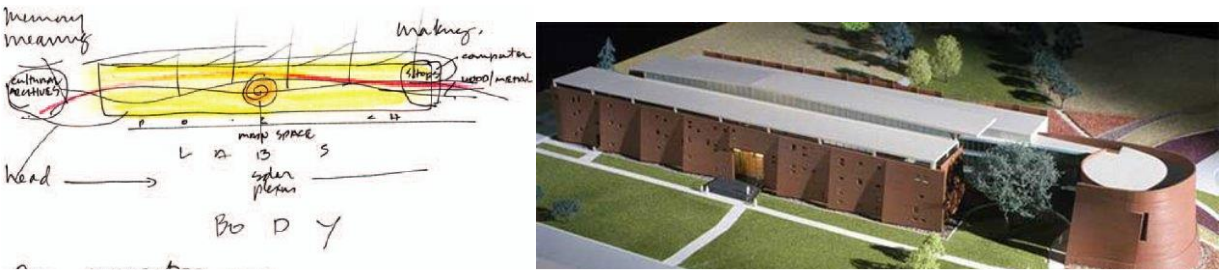


Fig 1 Michael Rotondi; PVAMU Head to Body. 'Prairie View A&M University, School of Art& Architecture,2002 '
Form and process : proto elements of final image in the diagramatic sketch.

Analyzing the sketches of modernist and contemporary architects I found that they tend to use one (sometimes both) of the following ways of sketching :
1) Searching for ideas through thinking sketches, that correspond to Gabriela Goldschmidt`s "treasure hunting" [10]. Through this reflective process of sketching the architects try to find new ideas and refine the existing ones.
2) Externalizing ideas through idea sketches, reflections of apparently instant ideation. Presented as a whole, in a few hand strokes, the solutions seem to appear instantly, perfectly defined as form. Rapidity is the essential characteristic of this type of sketch.
Very different in scope and means these sketches still share some common traits: they are design thinking tools - vehicles for design reasoning [10] [11]; they are quick and direct means to produce visual representations of ideas [8]; they represent a fast and spontaneous method of drawing [13];they are formulations of mental representations of a design product [14] they convey figural and relational properties directly [15] they are extensions of mental imagery [16] they externalize ideas.
As the differences between the two types of sketches are substantial we shall analyze them in separate subsections , describing their characteristics and the specificity of their contemporary evolution.

3.2 Discovering through the sketch - Thinking sketches

Through this type of sketching, leading to the discovery of initially inaccessible ideas [10] the architect aims to enhance/trigger the creative process through the continuous reinterpretation of the drawings.

There are two main modalities of discovery associated with this type of sketch. The first one is partly intentional. We sketch in order to enhance our capacity of mental imaging. Mental imaging is done with a facility of cognition (having a limited capacity) within the short memory called the "visuo-spatial sketch pad" . Complex tasks that exceed this capacity need to be externalized in order to supplement our visual way of solving problems through "spatial paraglogic" [11] . Discovery can occur in this phase of externalizing when we know partly what we are looking for, and try to offer a first solution to our problem through sketching. The second modality of discovery is unintentional and based on the ambiguity and vagueness of the sketch. Compared to the exactness and clarity of computer drawings, sketches are dense and ambiguous allowing for transformation and lateral thinking. Reading between the lines, analyzing unintentional slips of the pencil is a source of continuous discovery based on what the architect can visually perceive in the superposition of inexact contours . The two modalities are in fact intertwined and what we find in the ambiguous lines of the sketch is partly determined by what we are consciously or subconsciously looking for.

Alvar Aalto describes this process of idea finding that combines conscious and subconscious means :

"This is what I do – sometimes quite instinctively. I forget the whole maze of problems for a while, as soon as the feel of the assignment and of the innumerable demands it involves has sunk into my subconscious . I then move on to a method of working that is very much like abstract art. I simply draw by instinct, not architectural syntheses, but what are sometimes quite childlike compositions, and in this way, on an abstract basis, the main idea gradually takes a shape, a kind of universal substance that helps me to bring the numerous contradictory components into harmony." [17]

Aalto`s sketches for Vila Mairea (figure 2)perfectly illustrate this instinctual process of form finding

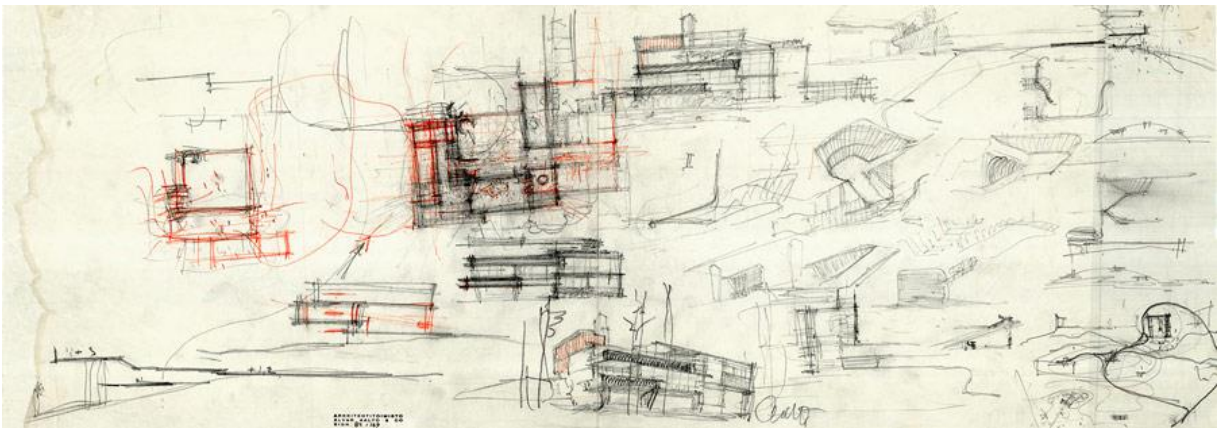
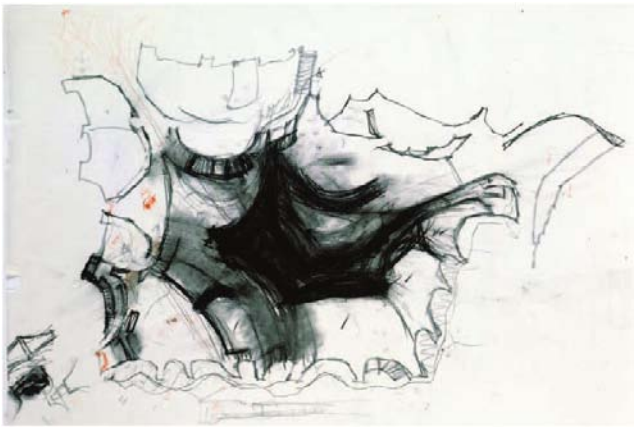


Fig 2 *Materializing thought - Mix of plans, perspectives, details* :Alvar Aalto sketches for villa Mairea

The repetitive moves in the dialogue with the sketch during the research for the hidden parts of the initial picture are perhaps best described in Peter Zumthor`s words:
Often however, they are not simply there, these visual elements of the image, when we start on a design and try to form an image of the desired object. At the beginning of the design process, the image is usually incomplete. So we try repeatedly to re-articulate and clarify our theme, to add the missing parts to our imagined picture" [18]

The use of thinking sketches is related to idea generation, to refinement of visual forms , therefore the drawing media is not indifferent. The resulted image must inspire and favor ambiguity. Sketches that are deep and Capturing the atmosphere of a building is also one of the main reasons of architects` sketches . Technique and media make these drawings expressive and vague at the same time [2] (Figure4) . The drawings have evanescent qualities, lacking in computer presentations that render forms perfectly but transmit an emotionally impoverished image. This is also the main reason hand drawings remain the favorite tool of landscape architects, that aim to convey not exact forms but moods, feelings, atmospheres.



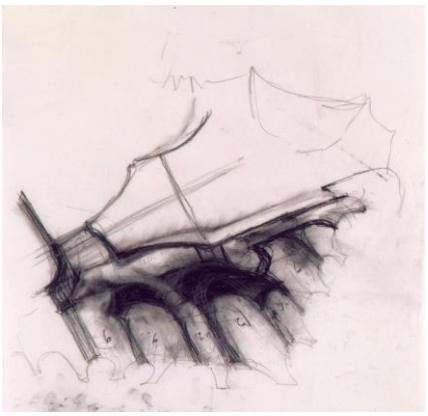


Fig 3 *Materiality of the sketch - Not exact but vibrant,alive,rich in sensorial qualities*:
Reima Pietilä; Kaleva Church, Tampere

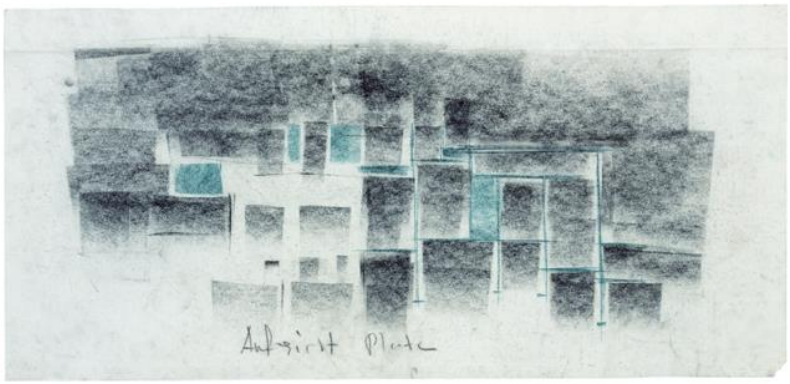


Fig 4*" When I work on a design I allow myself to be guided by images and moods that I remember and can relate to the kind o architecture I am looking for. Most of the images that come to mind originate from my subjective experience and are only rarely accompanied by a remembered architectural commentary."*
Rendering atmosphere: Peter Zumthor Concept sketches: Thermal Baths in Vals

3.3 Recording visions – Idea sketches

Being rapid and spontaneous, the act of drawing is the best means of capturing mental images. It is the way most of the contemporary architects use the sketch for rendering a strong initial idea. This corresponds very much to the well known Picasso quote : "I do not seek, I find" describing the fulgurant process of image creation in the visual arts. The main purpose of the idea sketch is making fleeting thoughts permanent [15]. "The act of drawing can be rapid and spontaneous but the residual traces are stable . The designer can examine them at lesiure. "(Donald Schön)[19]. This way, a phenomena that is perceived as an instant illumination, presenting to the author the essentialized final image of the building, can be recorded for further reference.

As the crucial role of this type of sketch is the quick capture of visual images, it is quite indifferent to media. The architect draws with what he has at hand. The word of architecture is full of stories and examples of architects sketching on newspapers, scraps of paper, paper napkins, with ball pens, borrowed pencils or even coffee stains.

This type of sketch is not absent from the work of architects belonging to prior generations, but it is perhaps less frequent than the thinking sketch. One of the most well known examples is Mendelsohn`s sketch of the Einsteinturm in Potsdam. In a few strokes the final image of the building emerges. The calligraphic drawing incorporates all the defining elements of the completed building. Presumably, this type of sketch supposes considerable previous mental image manipulation, either conscious or unconscious. Fig 5 shows the likenesses between the calligraphic qualities of idea sketches belonging to different periods.

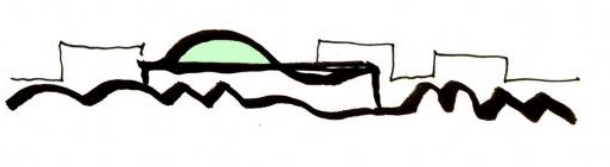


Fig. 5 *Calligraphy of thought* :
Erich Mendelsohn, Einsteinturm.
Henning Larsen Architects/ Van den Berg Groep: Emmen theatre and zoo competition

3.4 Moving between the two types of sketch – phases of sketching

You start by sketching, then you do a drawing, then you make a model, and then you go to reality - you go to the site - and then you go back to the drawing. You build up a kind of circularity between drawing and making and back again." [20] this is Renzo Piano`s description of the ceaseless dialogue that unites, trough the continuous adjustments made by the architect, the sketching process, the existing physical reality and the future architectural object. These various phases of design can be reduced to two main phases of sketching: capturing the initial idea and refining its details. The stages represent the inspirational component and the reflective process of design.

In the last decades significant changes have occurred in the drawing habits of the architects. They concern mostly the visual dialogue between the designer and what the drawing suggests. Before the advent of accessible computer modeling most of the settling process of the final forms was done by elaborate sketches. Details of the building were clarified and established mostly using tracing paper and generating series of sketches in order to accede to their perfect definition.

Today the most common procedure seems to be: the recording of the initial idea; sketching variants of its components and verifying/ refining them by computer modeling and/or through the use of physical models.(fig.6)

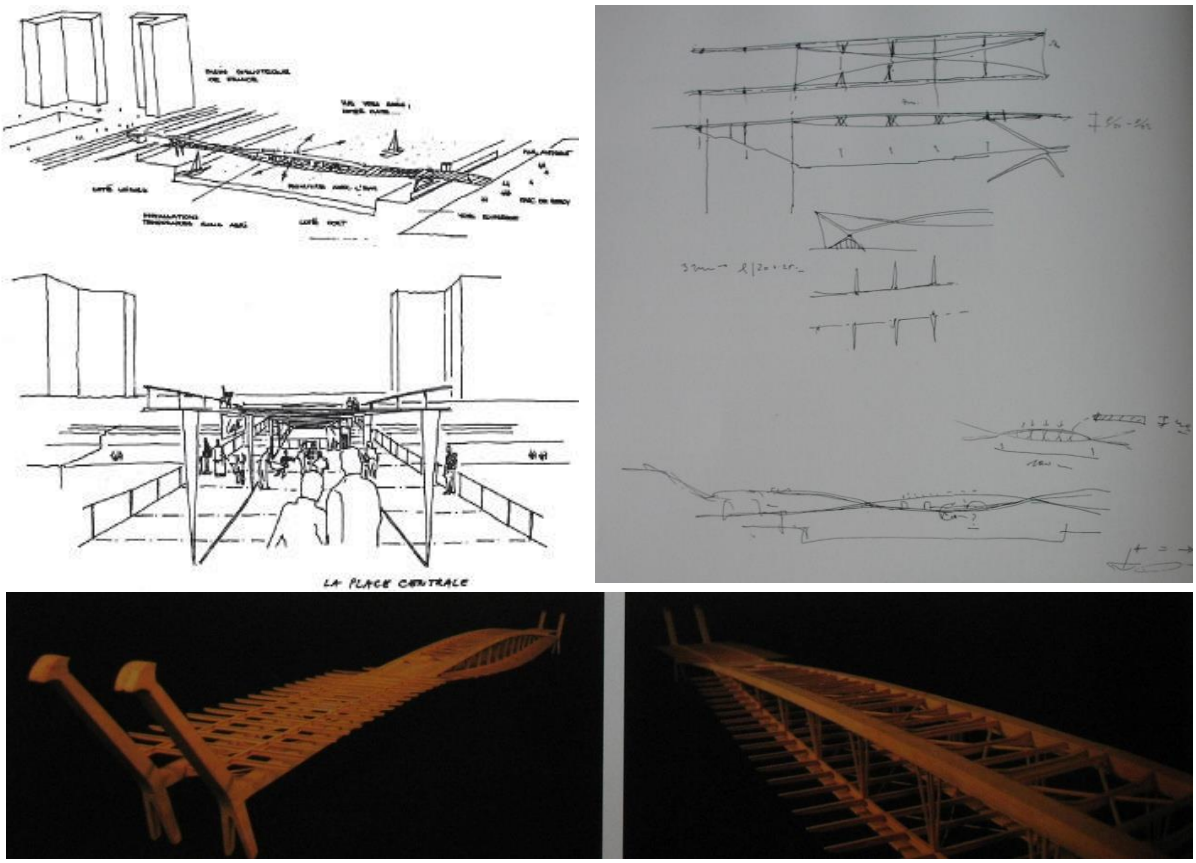


Fig 6 *Concept sketch and structural sketches as a preliminary of computer modelling:*
Dietmar Feichtinger :Simone de Beauvoir Footbridge, Paris.

This virtually eliminates the use of tracing paper, a phenomenon further enhanced by the favoring of adjacent displays of sketches, similar to the computer display. The choice between overlapping lines and the simultaneous judgment of superposed solution variants seems to be no longer in favor. This eliminates much of the fortuitous discoveries and accidental findings due to tracing paper techniques.

However sketchbooks are still very popular among students and young architects, proving that no mediated manipulation of form can compete with the qualities of the hand mind connection. Inspiration is also found in the interpretation of 'accidents" resulting from the use drawing media.

3.5 Not about exceptional drawing abilities – The importance empathic thinking

A great number of teachers complain about the disappearance of drawing abilities , mainly because drawing is neglected in high schools and also threatened by computer programs. Many architecture schools treat drawing as a skill, training their students in representational techniques based on observational drawing. This is not a wrong step in itself. Students need to be familiarized with drawing media.

Comparing human and computer representational abilities is ,again, not the question. There has been an intense debate on the quality of computer representations that lack finesse and poetic qualities. All these setbacks can be (and are) easily eliminated in good computer renderings by the use of complementary programs or techniques (Photoshop, collage, etc.) The utility and superiority of sketching resides in the fact that it is not (only) a representational ability but a modality of thinking. The history of architecture is full of examples of great architects that had "poor" drawing skills.By studying their sketches, and even representational drawings, we witness a process of visual and embodied thinking that succeeds in emphasizing the essential qualities of the design. Created through intellectual and emotional engagement their drawings, offer *not photographic precision but density of thought*, generating emphatic visions of the building.

Sketches reflect not only manipulation of visual form but also an embodied, visceral way of understanding that is common to thinking in art. John Rajchman speaks of the role of drawing in Richard Serra`s art as a way of reflecting what Serra called "thinking with one`s feet", defeating the usual hand-eye link. "Serra`s *process of thinking*, in other words, was his peculiar way of giving us , at least for a moment , a vital sense of another body, another brain, another field, in which *one thinks with one`s body*." [21] This embodied thinking, where the artist/architect not only creates the building through problem solving and external manipulation of form but becomes the building is common to great works of architecture. "The works of a great architect, likewise invite the imagined presence of his figure and hand, as the architectural space, scale and detailing are unavoidably products and projections of the maker`s body and hand."[3] Sketches are an unparalleled way of expressing the almost physical connection between the architect and the building. This connection is more or less present in every hand drawing, but is perhaps best illustrated in the empathic understanding of structure in Santiago Calatrava`s sketches.(fig.7)

Fig.7 *Externalizing the empathic understanding of structure :*
Santiago Calatrava; Human/Structure sketches.

Conclusion

How, and why do architects sketch ? Their goals and methods seem to have a constant: gaining access to their most deep and complex thoughts. Even if sketching habits have changed significantly, sketches are still the easiest way of externalizing architectural thinking.

The main changes concerning sketching in architectural design relate to the dominant presence of the idea sketch and the use of computer modeling in many of the detailing phases . These changes have obvious explanations and consequences . Architects are confronted with a continuously growing display of images. They have instant access to the worldwide creations of their colleagues, enhancing constantly their "private library" of built forms. So even if the capacity of form manipulation in the short term memory is limited, they can extract a noticeably increased number of images from the unlimited storage capacity of long term memory . There is thus a strong chance that conscious or unconscious adaptations of previous solutions, that fit a current design problem, could be instantly externalized, increasing substantially the percentage of idea sketches. Using computer modeling in the further detailing phases enhances the precision of the work, shortening time limits and eliminating errors but also eliminating the chances of fortuitous discoveries due to the use of tracing paper techniques.

The advent of digital sketching pads has already resulted in the partial replacement of traditional drawing media . Their use is perfectly adequate to types of sketching that do not relay on the physical qualities of the drawing. It is also probable that with the improvement of software their use will increase constantly.

As for the direct use of computer programs in the generation of architectural form we have some very good reasons for remaining skeptical. *"Theoretically, as long as a problem can be defined in logical terms, a solution may be produced that will address the problem's demands"* says Kostas Terzidis [5], one of the best advocates of computer generated design. A part of the problem can certainly be defined in logical terms, but what really makes great architecture are the innumerable factors that cannot be expressed logically, the emotional, subjective, personal decisions that we take during the elaboration of the architectural solution. In dealing with this type of embodied thinking, sketching still remains the most adequate means of expression.

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SYMBOLIC ARCHITECTURAL MONUMENT OF THE ROMANIAN ELITE

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Abstract

In the context of modernity, the beginning of 20th century meant for the Romanian elite, as well, an opening towards the European academic environment which could stand as viable model for the young developing Romanian *intelligentia*. Was there need for a Romanian school in Rome? What triggered the construction of a new building, and may we say that, from an architectural viewpoint, this building is a symbol of the Romanian elite?

Established in 1920 by Vasile Pârvan, its first director, the Romanian School in Rome only began its activity in 1922 due to the lack of appropriate premises to accommodate the needs of a complex institute.

The talks regarding the establishment of Romanian schools in the great capitals of Europe date back to before the beginning of the First World War, and their purpose was to create new cultural institutions for the study of Romance history and philology, for carrying on investigations in the great European archives and libraries; these institutions were meant to promote the research in university disciplines which were not yet being taught in the country.

In Rome, after many tries and propositions, between 1928 and 1933, the building in Valle Giulia was being erected, a building which was supposed to ensure, on the one hand, a representative image for the Romanian elite and for the national spirit, and, on the other hand, to fall naturally into the area's general environment. (The terrain for this building had been leased since 1921 and, all around, the construction of today's still-standing edifices had already been initiated).

The building outlined by architect Petre Antonescu is a monument of extreme architectural value, impressive through its positioning and shape; in time, this building became a symbol image of the Romanian academic environment in Italy.

The current paper aims at presenting both the preceding stages of the construction and the efforts made to erect this building matching the cultural elite which was supposed to be sent there for studies and gaining knowledge from the West's on-growing experience. A young elite open to Western experience needed a building especially designed to serve this purpose.

Keywords: *Accademia di Romania*, architectural monument, symbol, elite

1 SHORT HISTORY OF THE FOUNDATION OF THE ROMANIAN SCHOOL IN ROME

The talks about establishing Romanian Schools in the great European capitals date back to the beginning of the First World War, and regard the creation of such cultural institutions focused

on history and Romance studies, on doing research in the great European archives and libraries; these institutions were meant to hold research in the university fields which has not been, as yet, taught in our country. The procedures for the establishment of these Schools had been carried on after the end of the war, as well, with the permanent support of Vasile Pârvan and Nicolae Iorga, so that, in the autumn of 1920, law 4285, establishing the creation of two Romanian Schools, was adopted. The School in Paris was managed by Nicolae Iorga, and the one in Rome was managed by Vasile Pârvan. The two institutions were organised in four sections and included the best graduates of the universities in Bucharest, Cluj, Iaşi and Chernivtsi (Cernăuţi)

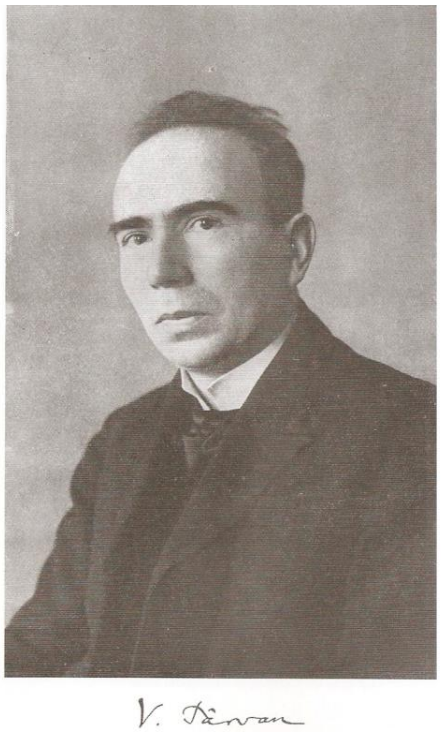
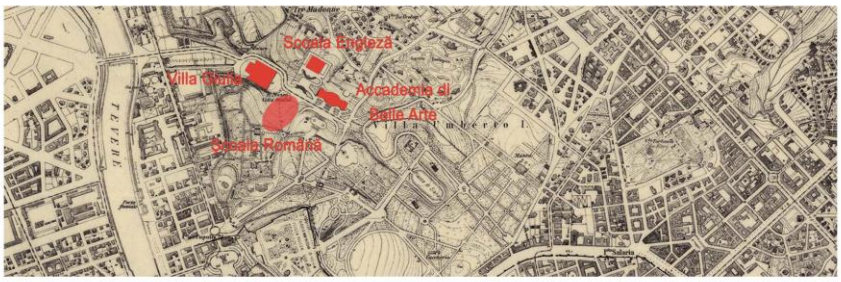


Fig.1. Vasile Pârvan. The Romanian School in Rome was established in 1920, but began its activity in 1922. Vasile Pârvan militated in favour of the Romanian School of Rome and is its first director (October 24th 1921- June 26th 1927). (Photography taken from the archives of Accademia di Romania)

Along with the Romanian government's endeavours to obtain the license on a terrain situated in Valle Giulia, a location needed for the construction of a facility deign of the school's aim, the Romanian School in Rome is inaugurated on November 1st 1922, in a temporary location, in no. 11 Emilio de Cavalieri. The Romanian government's procedures got a favourable result and the Municipality of Rome allowed for a permanent lease of the terrain which had previously been occupied by the Unites States of America building, during the International Exhibition of 1911. 1921 and 1922 were marked by explorations and endeavours to sensitize the Municipality of Rome with the aim to obtain the lease on an approx. 3600 sqm-wide terrain, close to the current National Gallery of Modern Art, and close to a field destined to host the future Museum for gypsum replicas [1].



Harta Romei la 1924. Este marcat viitorul amplasament al Accademiei di Romania. Singurele edificii din zona sunt Vila

Vedere aeriană. Roma la 1934. Zona Piazza del Popolo, Prati şi Flaminio. Este marcată clădirea Accademiei di Romania.

Fig.2. 1924 Rome map. The future location of Accademia di Romania. Only other facilities in the area – Villa Aerial view. 1934 Rome. People's Square, Prati and Flaminio. Clear mark of Accademia di Romania

All these efforts were made by the minister of the time, representative of the Romanian government in Rome, Al. Lahovary, and the results were soon to come. On May 14th 1921, Lahovary wrote the following to the Minister of Foreign Affairs: "I was invited to sign the lease on a wonderful terrain pertaining to Villa Papa Giulio, neighbouring Villa Borghese, in front of the National Museum of Arts. The result is considered a great success of Romanian diplomacy, it is the moment when we may see the projects of unfolding the activity of the newly-established Romanian school". And so, Al. Lahovary wrote: "I suppose the Romanian Academy in Rome could also be a museum and an institute with artistic studios for students, a home for fellow students and artists, as well as home to the director". The circulating name was: „Academia Română de Istorie, Arheologie şi Belle Arte"[2] (The Romanian Academy of History, Archaeology and Arts).

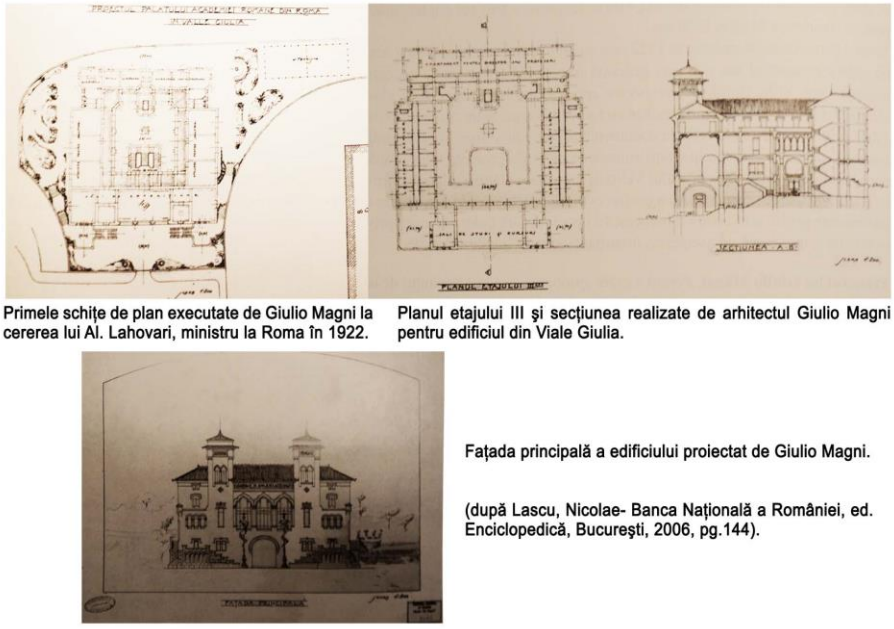
The lease given by the Municipality of Rome came with a few conditions commanded to the Romanian government:

- The continuous maintenance of the initial objective given to the Romanian institution (history, archaeology and arts). Should the Academy had been given a different purpose than the one specified, the lease would have been withdrawn and the terrain, including the constructions, would have been given to the Rome Municipality without any indemnification;
- The symbolic payment of one Italian lire to the Rome Municipality each December 31st: "a simple recognition of the possession of Rome of the given terrain";
- The construction of a particular facility with the given function, a construction whose project was to be approved by the Municipality Technical Office and which had to be finalised in five years' time since the signing of the agreement (the only condition which was not fulfilled, as the term was prolonged various times);
- Respecting the proprietorship of Rome Municipality over the objects discovered during the diggings on the building foundations[3].

2. ACCADEMIA DI ROMANIA BUILDING – ARCHITECTURAL MONUMENT

Even before the leasing on the terrain, Al. Lahovary had charged architect Giulio Magni with the first sketches of the future building of the Romanian Academy. Giulio Magni is one of the most important figures of the Italian school of architecture, having worked for 11 years, and having been selected as architect of Bucharest for a brief period of time, in Romania. Among the most important building designed by him, we mention: the Traian Market Place, the Public Department Stores, the "Mavrogheni" Primary School on Kiselef Boulevard, the current headquarters of the Technical Military Academy, the Curtea de Argeş train station, and other various dwellings[4].

During the discussions on leasing the terrain for the Romanian School (at the beginning of the 20s), Giulio Magni was consul of Romania to Rome and he was involved in the construction of the Palace of the Ministry if the Marine, near Valle Giulia, on the banks of the Tiber. The involvement of architect Giulio Magni in the elaboration of the first sketches of the project for the Romanian Academy in Rome was one of the favourable preconditions and a card in letting the terrain asked by the Romanian government. Giulio Magni was supposed to elaborate "a sketch of the plan which had to be modified according to our requests, but which can be the basis for the definitive project of the Palace"; the architect was also supposed to keep to the "Romanian-Byzantine" style, so representative to our traditional architecture, while keeping with the time's endeavours to create a national style (whose initiator was Ion Mincu). The project's boards are kept in the Magni archive at Velletri.



Primele schiţe de plan executate de Giulio Magni la cererea lui Al. Lahovari, ministru la Roma în 1922.

Planul etajului III şi secţiunea realizate de arhitectul Giulio Magni pentru edificiul din Viale Giulia.

Faţada principală a edificiului proiectat de Giulio Magni.

(după Lascu, Nicolae- Banca Naţională a României, ed. Enciclopedică, Bucureşti, 2006, pg.144).

Fig.3. Sketches made by architect Giulio Magni. The first sketches made by Giulio Magni at the request of Al. Lahovary, Minister in Rome, in 1922. The design of the 3rd floor and the section done by architect Giulio Magni, for the building in Valle Giulia. The main façade of the building designed by Giulio Magni. (apud. Lascu, Nicolae – National Bank of Romania, ed. Enciclopedică, Bucureşti, 2006, p. 144).

After having obtained the lease and the involvement of the National Bank of Romania in financing the construction of the facility, architect Petre Antonescu is asked to elaborate the design of the future building which was supposed to have an architecture expressing, in the opinion of the Romanian authorities, the national spirit which had led to the foundation of a superior school in the heart of the Latin world[5]. Architect Giulio Magni was commanded with monitoring the works.

Petre Antonescu elaborated no less than three projects until the definitive form fully accepted by the Italian fora. The first project elaborated dates back to the end of 1924 and still keeps the architectural line of the Romanian style which Antonescu approached and promoted during his entire career. The Romanian government, through its minister in Rome, asked the Municipality Technical Office for a notice on the style of the construction. In his request, Lahovary mentions: "Our wish is to express our intentions… building the facility according to the Romanian architectural style, more so as we find an important Byzantine influence in Rome's monuments, too, and in many Romanian monuments there is an accentuated Venetian-Dalmatian influence of Byzantine origin and of Italian design"[6].

Primul proiect realizat de Petre Antonescu- Perspectivă

Fig.4. Perspective of the first solution proposed by Petre Antonescu. Apud Lascu, Nicolae- *Banca Naţională a României şi arhitectura*, Ed. Enciclopedică, Bucureşti, 2006, p. 147

In an open letter to I.G. Duca, the Romanian minister foreign minister at that time, Vasile Pârvan wrote: "Antonescu worked with much enthusiasm and determination to create a long-lasting work of art. His projects raised such enthusiasm in the National Bank, that the coldest and most sceptical of managers, Mr. Capitanovici, is now the work's most fervent promoter. Seeing the work, he hailed: we will gladly give not 2,1 million lire, but 4 million if it's necessary, so that such a Romanian work of art may rise with dignity in Rome"[7].

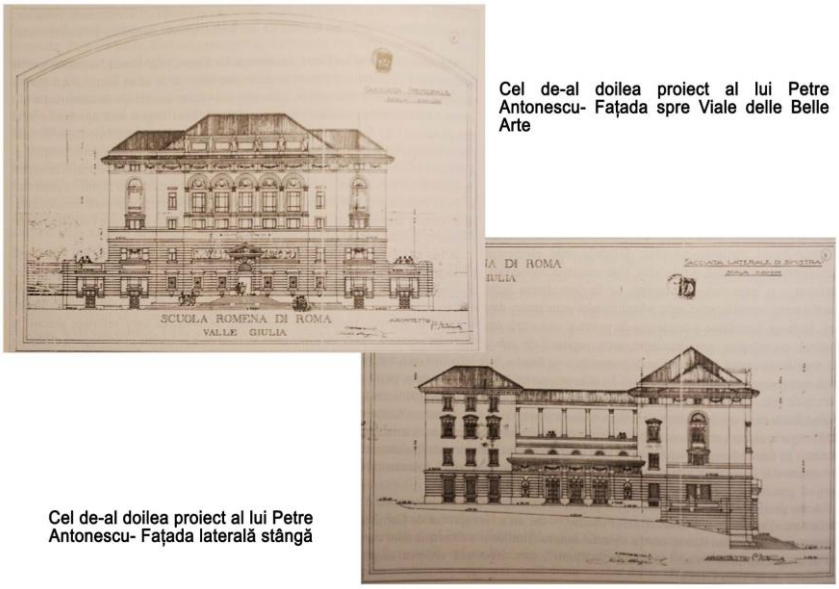
On January 2nd 1925, the united Commissions of Urbanism and History of Art of the Municipality's Inspectorate for Constructions discussed the presented project. The decision taken read that "no Valle Giulia facilities can be excluded *a priori* from the national architecture of the different countries who'd gained the permission to build their own facilities there, on condition that each project wouldn't contrast with the natural environment of the location, and with the main pre-existing buildings, that they be in proportion with their dimensions and positions, that the architects commanded with the works establish *a priori* agreements with the municipal administration regarding the conditions they were about to respect for the respective buildings"[8]. For this reason, the project was approved and part of the works had begun.

Antonescu's project took some elements from the sketches made by Magni, such as: the building's position on the field, the project unfolded around a central interior courtyard, the general planimetric composition, the symmetry of the main façade. The project was criticised by the specialists in art history and architecture, experts who, at the time, benefited from the veto right regarding the construction of such a facility. They considered that the style of the building was hard to integrate in the chosen area due to the fact that there was already a

predominant style and a particular environment. And so, at the end of 1925, the General Department for Antiquities and Arts of the Ministry of Public Instruction opposed the prosecution of the construction works.

The style of the area was considered to already be conditioned by the existence of yet another classic building – the British School, and the eclectic style of the Palace of Belle Arti, since the second decade of the 20th century. Therefore, the fully accepted style of the area had to be of classic inspiration.

In 1926, Petre Antonescu modified the project according to the recommendations made by the members of the commission, but he kept the planimetric order and the initial monumental aspect. This project, too, received unfavourable regards: "although it finds a better harmonisation with the architectonic lines, the project keeps the same dimensions, which would crush the architectonic jewel represented by the *nymphaeum* of Pope Giulio's Palace, which is one of the most beautiful establishments of Italian art"[9].

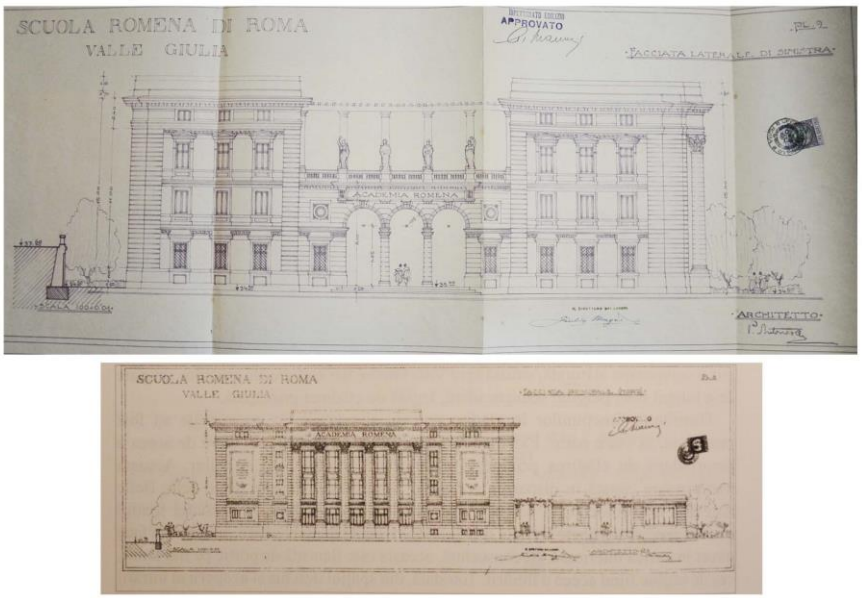


Cel de-al doilea proiect al lui Petre Antonescu- Fațada spre Viale delle Belle Arte

Cel de-al doilea proiect al lui Petre Antonescu- Fațada laterală stângă

Fig.5. Sketches of the second project of architect Petre Antonescu. Apud Lascu, Nicolae- *Banca Națională a României şi arhitectura*, Ed. Enciclopedică, Bucureşti, 2006, p. 147.

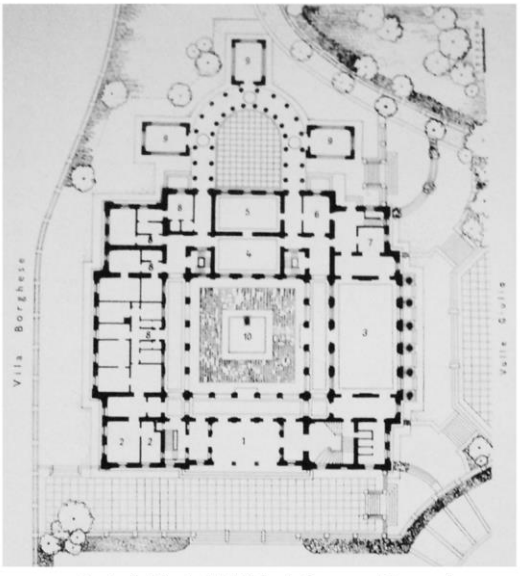
Petre Antonescu had to draw a new project. The matters subsided. Mussolini supported urging the new headquarters of the Romanian Academy. The inconveniences caused by the late start on the construction were settled with the accession of the leased area with some other 870 sqm, a terrain situated towards Villa Borghese Park. The current area is of 5596 sqm. The new imposed conditions also included regulations regarding the height of the building (which was not to exceed 19 m), at least 30 m retreat of the building from Viale delle Belle Arti. The building's books and the volumes used were meant to harmonise with the general image of the area and not affect or overshadow Pope Giulio's Villa. Considering these requests, one last version of the project will be elaborated (that is the image of the built facility, with small modifications). There is a major change regarding the previous projects: the artists' studios are externalised and grouped around a semi-circular pergola, adjunct to the main building. Another alteration is brought by the change in the building's main access – the access is not done through Viale delle Belle Arti, but through the small square, now called José de San Martín.



Proiectull final al lui Petre Antonescu (şi cel executat)- Faţada principală şi cea laterală stângă

Fig.6. Sketches of the final project. Archive of Accademia di Romania

On January 27th 1928, the headstone of the Palace of Accademia di Romania in Rome was being set; the contruction to the facility will continue through 1929 until 1931. Giulio Magni kept an eye on the works until his sudden death in 1930, when the oversight on the works was taken over by architect A. Lardel, assisted by engineers N. Petrini and E. Perticari, under the control of architect Radu Dudescu, representative of the Romanian National Bank. Moreover, the National Bank of Romania financed the purchase of the building's furniture, and in 1931 approved a new series of works for the systematization of the area, drainage, offset etc. By the Christmas of 1931, the Valle Giulia facility was finalised and the institution is moved to the very edifice. The proper functioning of the new location began on January 1932.



Proiectull final al lui Petre Antonescu - Plan parter

Fig.7. The facility project. Apud Antonescu, Petre- *Clădiri, construcţii, proiecte şi studii*, Ed. Tehnică, Bucureşti, 1963, p. 24.

The architecture of the building, already in line with eclecticism, has a stylistic coherence given by the unitary facades, symmetrically set towards a central pivot. As opposed to previous projects, we may assert that the architect was limited with regard to the use of

decorations and he kept an elegant balance between the more ornate parts and the simpler ones. The main façade was emphasized by the monumental colonnade, which ran on three levels and was set in perfect symmetry towards the main access to the building. The colonnade includes three spans with central arches, sustained by two central columns and two columns at the back of the lateral volumes of masonry, columns ended with composite capitals by an impressive stone work. The access is made directly into the interior courtyard where, through a portico which expands over three parts of the building, the facility has a functional distribution. A monumental staircase in the portico with main access leads to the superior floor allocated to various offices and the two-story library, which has a marginal gallery positioned in the immediate contiguity of the director's office. (At the beginning of the Second World War, this was considered the most complex library of Oriental studies in the Italian capital). Symmetrically, the staircase leads to the director's apartment, situated on the same level.

In the monographic volume entitled "Clădiri, construcţii, proiecte şi studii" (Buildings, constructions, projects and studies) architect Petre Antonescu describes the principles and the composition of the elaborated facility[10]: "A cavity in the terrain, set on the same side as Pope Giulio 2nd's Villa, the basement of the building was used as a duty courtyard. The border of this courtyard, which had a semi-circular shape, was decorated at the level of the ground floor with a semi-circular colonnade, connected in three symmetrical points with small pavilions, set as studios for the artists (painters and sculptors). The underground, open to the duty courtyard, includes: basements, kitchens, the office and the boiler, on the one side, and on the other side (towards the main street) a second reunions' room directly under the ground floor conference room. The first floor includes: a grand athenaeum (library), which can be accessed through a staircase from the ground floor; the athenaeum is situated on top of the conference room, studios and study rooms (...). The second floor has the exact same general disposition of the first floor, including: the library gallery, dwellings for the members of the institute, foreseen with duty extensions and necessary sanitary rooms, situated over the study rooms on the first floor". All in all, besides the director's and the secretary's apartments, the building in Valle Giulia had 12 dwellings for the scientific members of the institute and six studios for architects, painters and sculptors.

Interiorul în perioada interbelică: biblioteca, birou şi scara principalăde acces la etaj (Arhiva Accademiei di Romania in Roma).

Fig.8. Interiors. Archive of Accademia di Romania

The inauguration of the facility of Accademia di Romania in Rome took place at the beginning of January, in the presence of Benito Mussolini and several Italian officials.

Due to the project's evolution during the various stages of its design, architect Petre Antonescu managed to set the new facility in the surrounding context, which was strongly marked by the history of the Eternal City; at the same time, the building became a very articulated entity within the natural and monumental environment of the area.

3. A MODERN BUILDING FOR AN EVOLVING CULTURAL ELITE

The commemorative plaque set in the main hallway reads: "During the days of King Ferdinand and King Charles 2nd, the National Bank of Romania built this facility for the progress of Romanian science and art, in the eternal light of Latinity, and as a symbol of the blood and cultural ties between Italy and Romania. Anno MCMXXXIII. This facility was built-up according to the designs and under the oversight of architect Petre Antonescu". This text emphasizes the precise objective of the edifice, an objective considered a natural action of accession of classical academic research, of the ideas of artistic modernity and of architecture to the tendencies of a Western world where modernity was flourishing. The possibility of gaining access to the immense quantity of information in Rome's museums, archives and libraries was an added gain brought to the professional training of those who could get here, the majority of fellows having risen from the ranks of their study field at their return home.

The building of the Academy holds a special place among Petre Antonescu's accomplishments, mainly because of the symbolic meaning it had, but also due to the fact that it had to become an emblem for a rising country and elite.

Fig.9. The current situation of the building. Personal archive

Along with the establishment of the Romanian School in Rome and with the building of a facility destined especially for this purpose, Romania came in line with the countries that had schools and "academies" in the Italian capital. France is the first one to open such an academy. The Villa Medici Accademia di Belle Arti (1666), subsequently completed by the school of archaeology and history (Ecole Francaise de Rome, 1873). The German Institute opened in 1871, in Rome; Spain founded in 1874 an Academy of Fine Arts, and in 1910 a school of archaeology and history. Since the beginning of 1800, Austria had an Institute of Historical Studies, and Hungary opened in 1894 an Academy of Fine Arts. Sincer the beginning of 20th century, the British School at Rome came into being, as did the Belgian Historical Institute (1902) – later called Academia Belgica (1939), the Dutch Institute (1904), the American Academy (1913). After 1924, the academies of Czecoslovakia, Sweden, Poland, Finland, Switzerland and Denmark (1956) came into being[11].

Exceeding the period of the imposed classical style, the buildings of the academies that came to complete the area between Villa Borghese and Pope Giulio's Villa, in time, no longer fulfilled any architectural line. The facility of Accademia di Romania remains, to this day, a memorable presence, true architectural monument, not only for its decorative elements, but mainly because of the symbolic implications and stories that it hides behind the simplified classic façades.

Fotografie de epocă- aprox. 1930-35 (Arhiva Accademiei di Romania in Roma).

Fig.12. The main façade during the inter-war period. Archive of Accademia di Romania

In an article dedicated to Accademia di Romania, Italienist Alexandru Marcu, one of the first fellows of this institution, emphasized the importance of the institutions and of the edifice: "Objectively, the academic institution, whose facts and two-decade long past it so eulogistically presents, is meant to insure our Romanian intellectuals and academic life personalities trained in that superior environment... But, subjectively, the Romanian School in Rome, presents something extra, whose spiritual value cannot be overlooked. ... It assumes the responsibility of maintaining and strengthening the programme of previous great Latinists, based on classical and national foundations... With this mission, it also assumes the responsibility of keeping alive a conscience which helped proudly build not only the title, but

the very proof of the historical existence of a people of hard workers and soldiers for a cause which, even though it remained national, could integrate within the historical development of Europe, of that Europe where Rome, through its new historical shapes, which created not only once, always had a say".

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Photographies: Archives of Accademia di Romania, architect Mihaela Lazăr, architect Codina Duşoiu, Roxana Mihaly.

A MONUMENT, AN ARCHITECT, A RESTORATION

THE RESTORATION OF THE POTLOGI PALACE 1954/56

ARCHITECTS: ŞTEFAN BALŞ, R. UDROIU, R. MĂNCIULESCU, ENG. I. HOSSU

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Abstract

In 1698, on the Potlogi estate, Constantin Brancoveanu started to build a new royal house and the first of the four palaces intended for his sons: Constantin, Stefan, Radu and Matthew. The new building of imposing dimensions, unusual for that time, was fully erected in the autumn of 1699. The historical circumstances made that, after 15 years since it's completion, the palace had to be robbed and abandoned. One hundred years later it was already in ruins. Since then the building has been exposed to the weather, year after year, being brought in a very advanced state of ruin. The purpose of this paper is to briefly outline the history of the ‹Brâncovenesc› monument, to present the architect and the team that was dealing with the restoration and todescribe their approach to the work done in the mid 50's.

The architect's name, Ştefan Balş, is inextricably and naturally linked to the architectural restoration in Romania. Between 1922 and 1928 he attended the Faculty of Architecture in Bucharest, having as teachers professors like Petre Antonescu and Paul Smărăndescu. In 1928 he receives a two year scholarship to Accademia di Romania in Rome, where he had the possibility to attend Professor Gustavo Giovannoni's lectures at Universita La Sapienza, and to study restoration projects from some important sites from Italy. He prepared for his future specialization, not expecting to that, as he was saying many years later, at 81 years, "I wouldn't know that I will like it so much that I will never leave it during my lifetime".

The Potlogi Palace restoration, carried out by a team led by Ştefan Balş, wanted to be a reconstruction through the additions necessary to restore the shape, the volume and the original decoration, executed on the basis of documents, surveys, copies or interpretations of similar items found in monuments from the same époque. The ultimate goal was to bring back into service and to restore the old look of the entire Court, aiming to preserve the monument within its original context.

In an issue of the Architecture magazine, the architect Ştefan Balş was describing the steps followed on the restoration and the conclusions that were reached after the research: "In the state that it is today, the Potlogi Palace it is only a ruin, an object of study for researchers interested in the mysteries of the past. Following restoration, it will reappear in its old coat, as a vivid picture of artistic craftsmanship of the people. This way, the Romanian architecture regains a link to the work of craftsman Brancoveanu, and between the starting point of the Hurez monastery and the endpoint of the exuberant carved stone decorations of the palace at Mogosoaia. By extending the work to the entire ensemble it is taken the first step on a path that should be followed by the restoration approach on our most important monuments. Neglected so far, this modifying action to amend or even to create a more adequate framework – the only one able appreciate the real value of these art objects - must constitute one of the main points to follow in the restoration projects of today"(Arch. Ştefan Balş - Architecture Magazine 1960). By this confession, the architect declares his position on the restoration process, that should start from deciphering in the walls of the monument of the

items that changed or are missing, through the execution of a research and surveys as accurate as possible, everything in the idea of observing the succession of all historical stages inscribed on the monument to help restore the original appearance.

This way he defined a traditional method of restoration based on same principles to which the architect was remaining faithful his whole life and so he was marking one of the main directions for the national heritage conservation.

Keywords: restoration, tradition, architectural monument

1 BRÂNCOVEANU COURT FROM POTLOGI

Photo 1. The Potlogi Palace, historical and arhitectural monument, code: LMI DB-I-m-B-17113.01, photo: october 2014

The Palace assembly is situated in Potlogi village, located between the rivers Argeş and Sabar, where the ruler had already an old property. It appeareds first documented in 1689 at the same time with the removal of the reign of Nicholas Mavrocordatos.

That was the place where Constantin Brâncoveanu erected his second palace after the famous one from Mogoşoaia. According to Ştefan Balş, the Potlogi Palace was built in 1698, the testimony being preserved until today “on the inscription fixed on the entrance door wall, inscription that bear the following words carved in stone: <<These houses were raised from their foundation by the enlightened ruler –I, Constantin Brâncoveanu, starting them and finishing them on the year 7206 (1698) and at the tenth year of his reign, the boyar Mihai vtori Corbeanul being the governor>>”[1].

1.1 The brâncovenesc style

The name of the Brâncovenesc style, or the name of Bracovenian art, appeared during the reign of Constantin Brancoveanu, 1688-1714, and it included, in extenso, also the works of art from the period after the reign of the prince Mavrocordat, until the year 1730. As a means of expression appeared to be analogous to the Western Renaissance, due to its own means of expression: clear structures, symmetrical floor plans, these all enriched by a decorative exuberance (sometimes called Brâncovenesc Baroque).

The Brâncovenesc style is characterized by a series of specific features like: placing the stairs on the main facade, the alternating turrets and logias that give rithm to the facade. The decoration of this architecture containes vegetal motifs of Baroque influence, motifs that are especially found on arches and frames, on columns and parapets. The proportions became more slender, in perfect harmony with the entire anssembly and, due to the decorative option, the massive volumes are denied and prefered the porches and the opened volumes. At the begining of the XXth century, thanks to the architect Ion Mincu, the style become "neo-brancovenesc" and it certainly prefigure the neo-Romanian style of the 1900s.

The neo-Brancovenesc style materialized in Romanian architecture over a period of several decades since the late nineteenth century till the end of the World War II. The neo-Brancovenesc architecture is individualized by the mixture of Byzantine elements (such as the arches and short columns combined with decorative elements borrowed from the traditional peasant art, with ottoman elements and some of them from the late Italian Renaissance that was used as a major influence for the palaces of the times). One can say that the neo-Brancovenesc architecture was rather a movement than a style.

Photo 2. The Potlogi Palace porch. Photo: september 2014

1.2. A short history of the Potlogi Palace

The Palace frequently appears mentioned in the cronicles of the Constantin Brâncoveanu reign as a resting place during his frequent trips to Târgovişte. Towards the end of his reign, the Otoman severely reproached the greatness of the palace. After the well-known exil, the Turks took possesion on Brancoveanu's wealth, leaving with "forty carriages full with found objects, loaded and delivered to the sultan, leaving behind devastated and abandonated homes"[2].

If, following the departure of Constantin Brâncoveanu from the throne, it is known that the Mogoşoaia Palace became an inn for travelers, the details of the new functions or destinations of the Potlogi Palace are not known. It was visited, in the year 1778 by the historian F.J. Sulzer, who described it as a "decrepit and fallen into ruin", but acknowledging the fact that "had been executed in a brilliant way with good taste and great expense. (...) everything, however wild now, it is showing european taste and entrusts the visitor that he has been elevated by foreign craftsmen through the wealth of a rich prince"[3].

Photo 3. The Potlogi Palace porch. Photo: september 2014

As stages of restoration, rehabilitation, or just maintenance the are a very few news, mentioned by Ştefan Balş in his book „The Brancovenesc Court of Potlogi" . This way some of the repairs are recorded:

- In 1848, a roofing repair, " restored shingle ", by the order of a Russian commander of troops who lived in the palace,
- In 1860 and later, carved decorative elements were taken and used to renovate palaces in Bucharest and Mogoşoaia ;
- In 1905 the kitchen was demolished, and then some stone carved elements were extracted causing masonry breakage.

Until 1910, the gradual dismantling by the locals or the estate administrators, allowed the disappearing of the roof joists, parts of slab along with the wood beams, doors and windows,

masonry, etc. In 1910, the authorities declare whatever was left from the initial building as a historical monument in the attempt to save the building's walls.

Fig. 1.—Palatul de la Potlogi, înainte de restaurare. Faţada sud. (Clişeu I.C.S.O.R.)

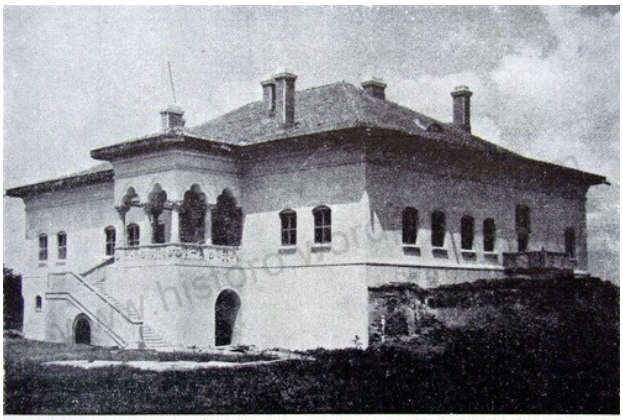

Fig. 2.—Palatul de la Potlogi, după restaurare. Vedere sud-est. (Clişeu arh. Paula Petre)

Photo 4. The Potlogi Palace in ruin. Source: http://casedeepoca.wordpress.com/2011/05/20/palatul-brancovenesc-potlogi-la-granita-dintre-restaurare-si-imaginatie/

From 1956, the year when the restoration work begun, there was a survey done by the architect Ion Traianescu in 1912, which showed that there were attempts to document and restore the palace in the first decades of the twentieth century.

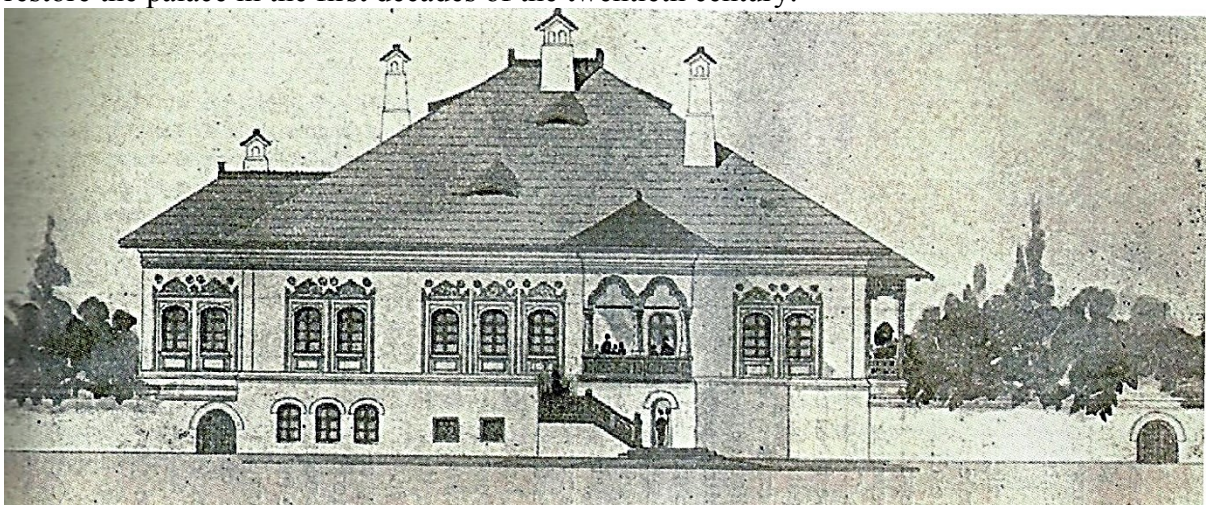

Photo 5. Survey of the main facade, arch. I.Traianescu, 1912, source: Phd. Arch. Ruxandra Nemţeanu[4]

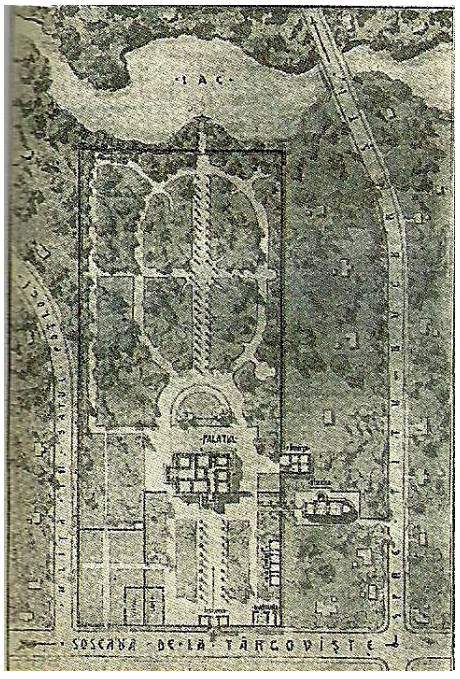

Photo6: Landscaping plan of the park

arh. I.Traianescu, 1912,

source: assoc. Prof.Phd. arch. Ruxandra Nemţeanu

However , a hundred years later the building was already deserted and ruined . Since then the building has been exposed to the weather, year after year, bringing it in an advanced state of decay, condition aggravated by the deliberate dissapearnce of various materials.

1.3. Brief description of the initial volume of the Potlogi Palace

The most documented details about the initial image of the Potlogi Palace were presented by the architect Ştefan Balş in his book „The Brâncovenesc Court of Potlogi" and in several articles published in the „Arhitectura" magazine.

This way, we find that the palace was located in the center of a rectangular courtyard, bordered to the north by the waters of a pond and closed on the other three sides by a high brick wall. A special emphasis was placed on the site planning, the land being divided into three different courts planimetrically and functionally: in the front, next to the road, there is the reception courtyard extended to the main façade of the palace; the second courtyard is on the left side and functioned as a service court with a street entrance separated by the first courtyard by a row of buildings with porticoes, whose foundations were dug out by the archaeological excavations carried out between the years 1954-1956. In the back of the palace there was a garden stretching down on a mild slope to a pond, almost dissapered today. The volume of the palace with ground and first floor, with a rectangular plan of (32 m, main façade and 23 m, the side one), was accessed through four external stairs located on each side of the building, the main one being made of stone and out of wood the other three. The turret's volume, in its unbalanced position on the main facade and the one that comes out of west façade axis, are the elements that bring a play to the prismatic building that reminds of the old Oltenia houses.

One third of the ground floor is occupied by a vast cellar, vaulted by four spherical caps supported by a central pillar. Two windows in the facade masked by a stone carved screen ensures the ventilation and the lighting needed for this room. Interestingly, between the four domes was discovered a hideen vault accessible through a narrow tunnel located in the floor. The ground floor is completed by a number of rooms placed symmetrically towards the cellar. On the rear side, a loggia with semicircular arches supported on massive brick collars, made contact with the outside, with a presumed Italian-style garden. 4,50m tall, the ground floor acts as a base of 6m heigh floor and containing the main rooms of the building.

Planimetrically, the floor deploys on both sides of a corridor asymmetrically placed in accord to the axis of the building connecting the gazebo from the main façade with the loggia from the garden, separating the rooms supposed to form the lady's appartment from the ones from the the reception and the ones of the lord. On the rear facade towards North, there is a beautiful open loggia similar to known one of the Mogoşoaia palace, adorned with arches, columns and stone railings, superposed on the massive columns of the loggia on the ground floor . There was evidence that rooms of this floor were vaulted with monasterial arches with penetrations, and in some rooms, the births of the penetrations were supported on carved stone consoles.

Of a great beauty and refinement, richly decorated with lace carved stone, was the gazebo located on the southern façade with a porch with arches supported by trilobite carved stone columns. Also out of stone were the columns' shafts, base, and capitels, richly sculpted, balustrades of fretted stone and consoles emphasizing the birth of the penetration.

A rich original decoration could be found described in the writings of the travelers of the time, and a careful examination of the remains contributed to the overall picture of the

scenery. The stone carving , the painting and a variety of fine stucco deployment, an element characteristic of the epoque, a very large median molding and a cornice profile completed the pictorial image of the building. Every corner of the building is emphasized by pilasters consisting of a fine net of vegetal elements made of stucco embossed from the blue colored plaster. Thw windows and the doors are framed by borders of different motifs, crowned at the top of the gables and finials.

The volumetric composition, the planimetriy, the composition of the facades, the exterior and the interior decoration, the stone made decorative elements, the stucco, the wood, create a whole compositional complex based on past experience of external influences that bring more elegance and richness. In 1954 it is decided the start of the restoration of the palace. The work is carried out by a team consisting of the architects Stefan Bals , R. Udroiu, Rodica Mănciulescu and the engineer R. I. Hossu.

2. THE ARCHITECT ŞTEFAN BALŞ

The architect Stefan Bals, whose name is naturally and inextricablly linked to the architectural restoration in Romania. Between 1922-1928 he attended the Faculty of Architecturefrom Bucharest, having as teachers Petre Antonescu and Paul Smărăndescu. In 1928 he is awarded a two year scholarship to the Accademia di Romania, in Rome, where he will attend Professor Gustavo Giovannoni at Universita La Sapienza, Rome, studying restoration projectsfrom Italy. Here he will prepare for his future specialization, without thinking, as he would say many years later when he was 81, "that I would like so much that I will not leave if my entire life". When he returnes in the country, he will work for the Historical Monuments Commission until 1950, when this was disolved. The practical activities of the Historical Monuments Commission was provided by a Technical Service, led by the architect N. Ghika-Budesti, helped on the historical part by V. Brătulescu and V. Drăghiceanu and on the design and field work by four architects: Sterie Becu, Horia Teodoru, Em. Costescu and Stefan Bals, the last three trained at the same school in Rome. He will alway be grateful to the architect Horia Teodoru, his direct boss for the guidance he received, for the technical advice and for the example of scientific systematization of the work that have guided his way in the restauration field.

After the dissolution of the Historical Monuments Commission he will engage in a design workshop and will consider ending his career as a restorer. But in 1955 he founded a design workshop for restoration in Ispra (The Institute of Urban Construction and Planning), controlled by the Department of Religious Affairs, for which he is recruited and where he activated for a long time.

Among the most famous restoration projects : Churches Creţulescu (1932-1939) and Antim (1954) , a 17th century church in Iasi (1943-4) , the church of Neamt Fortress (1963-1970), Monasteries of Moldova (1966-1970) and Horezu (1961-1975) . He designed several original works such as Gordon Hayward villa (1936-1937) in Campina, the Balchik church and the Pherekyde and Constantinescu houses (1938) in Balchik.

3. THE RESTORATION OF THE POTLOGI PALACE

In the early 50s, the palace had only some walls that were partially demolished at the top, the vaults were collapsed entirely, the slabs over the ground floors and stairs with their access levels had dissapered, and there were no columns and railings to the loggia and the porch.

Were also missing all the woodwork, the beams, the door and window frames, and also almost entirely the interior and the exterior plaster. Only in a few places were found small fragments of the righ original decoration.

According to Mrs. architect Eugenia Greceanu[5], the Potlogi palace, after its looting by the Turks , it may have been given an inn use for travelers like the Mogosoaia courts. In Potlogi, the entire assembly will remain the property of the ruler's family until the late eighteenth century, being subject to deterioration and lack of maintenance during the Russian-Turkish wars. Its recording in a state of ruin is done by one of the historians who visited the palace, F.J. Sulzer, in 1778, when the owner was the chancellor Manolache Brancoveanu

Also there were no annexes, kitchen, stables and part of the walls surrounding the site, only the gateway survived more or less to the slow process of decay through wihich the whole palace was going. In 1949 the assembly is nationalized, without knowing to this date the order and the names of the owners who followed Brancoveanu .

The restauration done by the team led by St. Bals wanted to be a reconstitution by additions needed to restore the shape, volume and its original decoration, executed on the basis of documents, surveys interpretations, blueprints or similar items found at the similar monuments from the same epoque. The ultimate goal pursued was the returning in use and reconstruction of the old image, comprising the entire assembly of the court in the idea of preserving the monument in its original context .

The fiirst analysses carried out both on land and in the workshop generated a number of conclusions that have guided the restoration throughout its course. Quoting from the article by Stefan Bals Architecture Magazine no. 2/1955 :

"The restauration based on the principle of historical restauration – by consolidation work and by maintaining the monument in its current state, thus preserving its value as a historical document, it is not possible, given the the fact that the intention is to render it back in use and to reconstitute of the old appearance; The reconstruction will be done with all the additions needed to restore the initial shape, volume and decoration, executed on the basis of documents, surveys and possibly copies or interpretations of similar items found at monuments from the same era. The restoration is interesting from a cultural point of view, being possible to carry out a a scientifical reconstitution of a monument remained in its original form, without additions that altered its character. The restoration should be complete, including in its scope, as much as possible, the whole Court, for the purposes of the presentation of the monument in its original context.The new walls and vaults were rebuilt, in part of slightly reinforced concrete hiden under the masonry and plaster for better strength, using as a basis the existing ruin, which was integrated, leading to a diminishied value of the authenticity of the monument, but also eliminating the lateral forces and ensuring a better beahaviour in case of an earthquake. The solutions that were chosen were the result of many investigations performed around the monument, of the research and critical analysis of the traces and the fragments saved from the masonry, but also by studying the professional publications, the depictions of the travelers, or in the case of a complete lack of sources by comparison to the similar elements of other monuments of that time. In this way, the most important element restored by these methods was the loggia from the main facade, of whose shape and dimensions we given by the console capitels that remained embedded in the masonry and also by the capitels form the Northern wing of the Mogosoaia palace, known as being brought in from Potlogi.

Also, the determination of the shape and of various motifs of the railing was done by comparison to those performed at the Mogoşoaia palace, assuming that the same craftsmen would have worked there, and with the help of a gauze, stone fragments found during the

excavations carried out in Potlogi in early 20th century, period from which also dates the survey done by the architect I.D. Traianescu.

Due to lack of complete information, the team decided that it is impossible to restore, the painting and stucco decoration of the interior wich had various floral and vegetal motifs, the work of a true artist of genius .

However, the restoration could not include all the work necessary to a complete restoration of the palace and its dependencies. For financial reasons and in the absence of information the restoration was limited and led to a hypothetical form based on a comparison with other models of that era. It was remarkable the flair of the restauration team wich, with very little data was able to imagine and save from destruction one of the monuments that mark the Brancoveanian era .

In a number the Architectura magazine, the architect Ştefan Balş describes the steps followed by this restoration and the conclusions that have been drawn by prior research: "In the state that it is in today, the Potlogi palace is nothing else than a ruin, an object of study for researchers interested in the mysteries of the past. Following the restoration, it will reappear in its former coat, a vivid picture of the artistic craftsmanship of the people. Thus it is regained for the Romanian architecture one link in Brâncoveanu's craftsmen work, between the starting point of the Horezu monastery buildings and the terminal point of the exuberance of carved stone decorations of the Mogosoaia palace. By extending the work to the whole assembly it is taken the first step on the path that was followed in the restoration approach of our most important monuments. Neglected by then, this action of changing or even of creating a more appropriate context — the only one able to show the real value of these these artefacts- must be one of the main principles to follow in the restoration design of today. Through this confession, the architect declares his stance on restoration which should start from deciphering in walls of the monument of the modified or missing elements, going through the execution of more accurate research and surveys, all in the idea of observing the succession of the historical stages, written on the monuments, helping this way regaining the initial look. Thus he defines several principles of restoration to which he will remain faithful for the rest of his life.

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3 STEPS FROM OLD TO NEW[1]

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Abstract

The practical approach of the project is based on a personal theoretical model of intervention in the existing environment, may it be natural or built, seen as a process with certain stages that can be identified as being the same no matter the situation.

The conceptual approach is that of using traditional-historical elements from existing architecture in order to build within strong cultural areas.

Preparing the steps means building the program according to the objective needs and to the personal believes. It means having some pre-defined criteria of intervention and guessing the methods that will become clearer along the way.

Step One

Acknowledgement, stage of analyzing the existing environment, based on a combination of factors and criteria that make it possible identifying (on one hand) elements with a certain importance, consequently the recognition of their value (on the other hand).

Step Two

Retrieving (in terms of recovery / regaining) the valuable elements recognized before, which firstly means the decision to keep them. This step deals with the start of the intervention itself: it establishes the practical methods by which the valuable elements are physically recovered and aesthetically regained, previewing the place they will occupy in order to get new life and meaning.

Step Three

Revival which means the perpetuation of architectural elements recognized and recovered by exploiting their ability to adapt, change and regenerate in a practical and aesthetic way. The term "intervention" added to this step should be read more as the interpretation of the result than the process itself.

The intervention is more oriented to the re-interpreted past than striking new. The respect of tradition and the recognition, regain and revival of the above mentioned valuable elements leads to sustainability and continuity.

The result of the research and design process is a reflection of those initial criteria and methods. It should reflect the strong belief that even in this computer generated powerful images era, tradition stands above commercial and value above performance.

Keywords: Intervention, process, built environment, tradition.

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[1] This presentation and the one called "3 Steps from Land to House" are part of the same concept, two sides of the same research.

A study on the refurbishment of a countryside house, Berevoieşti, Argeş

"Architecture that doesn't respect the past is not respecting the present, because is not respecting people's primary need from architecture, which is to build a long standing home."

Roger Scruton – "Why Beauty Matters"

1 ARGUMENT

What makes us pay special attention to the old buildings we come in touch with? We are unconsciously attracted by qualities that contemporary architecture misses: humanity, common sense, creative skill, artistry. They emanate historical, cultural and aesthetic significance of a past often regretted.

Why do we consider old things – objects or buildings – as something irreplaceable? We feel that we are no longer able to make such things. They represent the roots, identity, familiar landmarks and the connection with the history that gives continuity. They have the emotional value of seniority.

Why do we cherish sometimes more the achievements of the past than those of the present? Because they are ours. They are our treasure built up by physical, human, cultural endeavour. But most of all, they represent the patrimonial heritage of previous generations to which we add our own accomplishments.

2 THE PHYSICAL CONTEXT

The commune of Berevoieşti is situated in the Getic Depression, at the curb of the Meridional Carpathians, in the "7 muscele" intrahill area between Dâmboviţa and Argeş rivers. The "muscel"s are hills massives separated by small depressions where there are ancient villages with large fruit orchards and hayfields. Here, along the Bratia river, the four commune's villages are located.

1. The Getic Depression (valleys)

The sloped courtyard of this small rural estate includes the main house and a second building used as hay barn and animals shed, placed uphill among apple trees.

2. The site

3 THE CULTURAL CONTEXT

The so-called Muscel area in the actual Argeş County spreads between Curtea de Argeş, the first capital, and Câmpulung Muscel, the oldest town of the ancient Romanian Country, both mentioned since the 13th-14th century. The traditional architecture from this well defined cultural area provides so powerful references that almost lays at hand a way to build even now-a-days.

3. Muscel architecture

4 THE APPROACH

The practical approach of the project is based on a personal theoretical model of intervention in the existing environment, may it be natural or built, seen as a process with certain stages that can be identified as being the same no matter the situation.

The conceptual approach is that of using traditional-historical elements from existing architecture in order to build within strong cultural areas.

4. Houses from Curtea de Argeş and Câmpulung Muscel

5 THE PROCESS

Preparing the steps means building the program according to the objective needs and to the personal believes. It means having some pre-defined criteria of intervention and guessing the methods that will become clearer along the way.

5.1 Step One (the Research)

Acknowledgement, stage of analyzing the existing environment, based on a combination of factors and criteria that make it possible identifying (on one hand) elements with a certain importance, consequently the recognition of their value (on the other hand).

Existing architecture, as a subject to intervention, can be judge according to some instances (patterns) initially introduced for restoration: historical (age), aesthetics (beauty), along with utility (usefulness). However, if architecture is the result of human action and every human product is the result of a creative effort, then it has its value from the start which should be therefore recognized.

5.1.1 Age

Architecture is built sometime in some place. During time, it passes through many "presents" that become as many "pasts" which leave their marks upon it. Age value comes today before historical and architectural ones.

In this case study, the affective / emotional value joins the age as a decisive value: this is a family asset, part of the personal heritage of the owner.

5. The owner family heritage

5.1.2 Aesthetics

May it be more a simple building than a piece of architecture, the existing house has its inner beauty that comes from the domestic scale, the decent proportions, a minimal care for decoration and a traditional countryside way of living. Moreover, it stood unfinished for many years.

The architect eye usually sees more what it could be than what it actually is. One could decide for using the possibilities of natural growth instead of total transformation.

6. The existing house

5.1.3 Utility

Nevertheless, utility is part of a building, so architecture cannot be properly appreciated outside it. This house was built out of brick and stone to be useful, to provide a living environment and it still firmly stands.

It embeds materials, energy and skill to build it, therefore it seems reasonable to keep and use them instead of producing new ones. However, some things were identified without importance, parasite additions or inappropriate elements.

7. Layers of use

5.2 Step Two (the Project)

Retrieving (in terms of recovery / regaining) the valuable elements recognized before, which firstly means the decision to keep them.

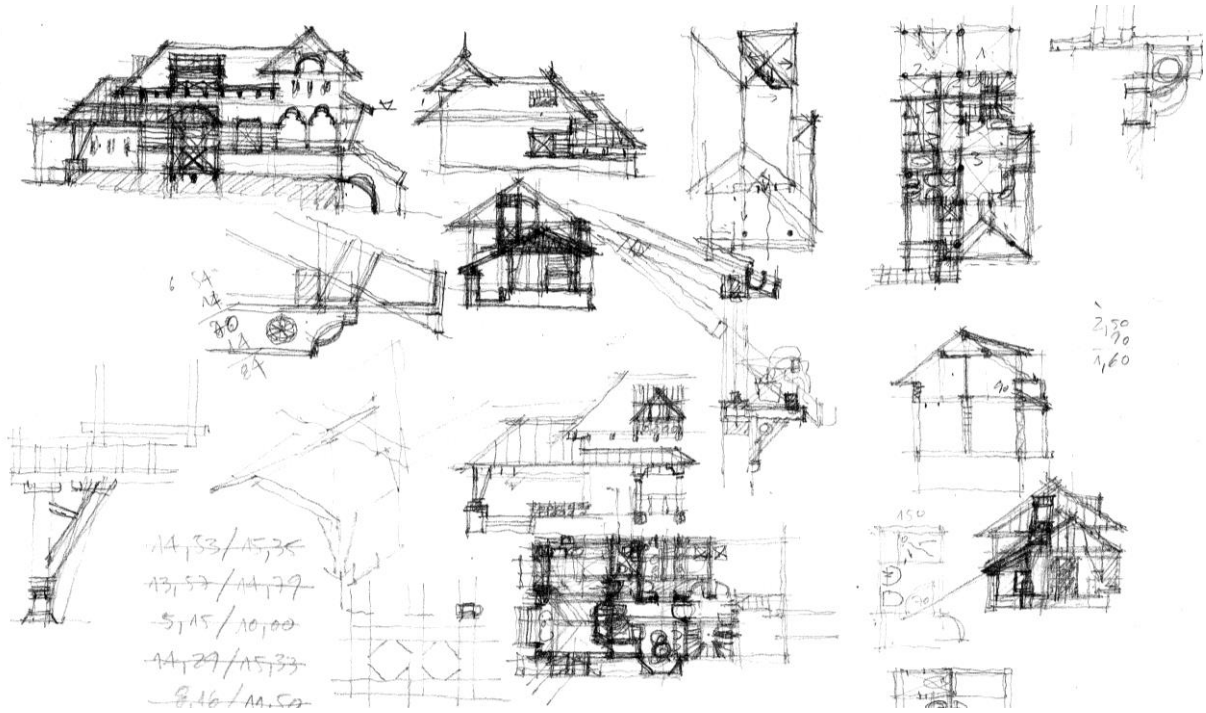
This step deals with the start of the intervention itself: it establishes the practical methods by which the valuable elements are physically recovered and aesthetically regained, previewing the place they will occupy in order to get new life and meaning.

The basis criteria come back from the stage of value recognition and could be grouped in historical, artistic, functional, economic, ecologic, emotional or personal-professional ones.

5.2.1 Level

The intervention over the existing built environment takes usually place at different levels: that of urban / town level, ensemble / group of buildings, object / building and detail / parts of building.

The study here deals with the building as a whole – which implied rehabilitation, refunctionalisation, joins, additions, space reconfiguration – and marks punctual detail interventions using the methods shown below.



8. Concept thumbnail sketches

5.2.2 Methods

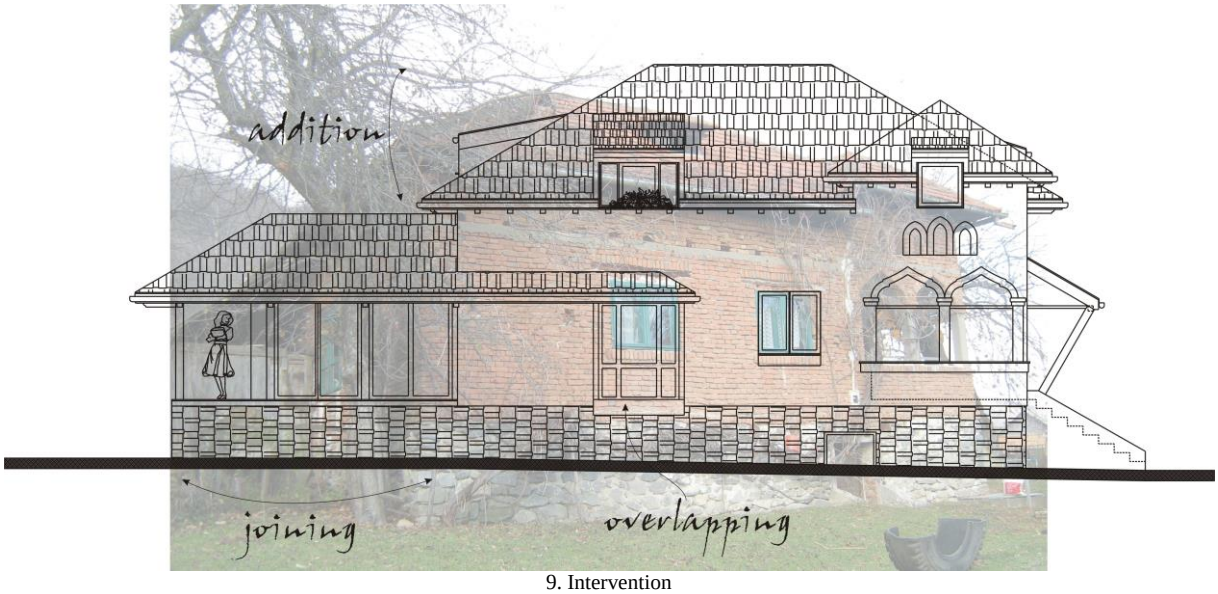
I should mention three major ways of new intervention on old buildings, identified as generally valid: overlapping, addition and joining.

Overlapping is the way to continue the transformation in time of the buildings. This kind of intervention creates evolving transformation; buildings grow up like humans.

Addition is a way of transition which consists of new parts linked more intimate with the old, more visible yet still progressive.

Joining is the usual way today of keeping respectful distance from the old, resulting generally a clear contrast between old and new.

In this case presented here, all this kind of intervention methods were meant to assure a natural growth of the house from the initial state to the desired one.

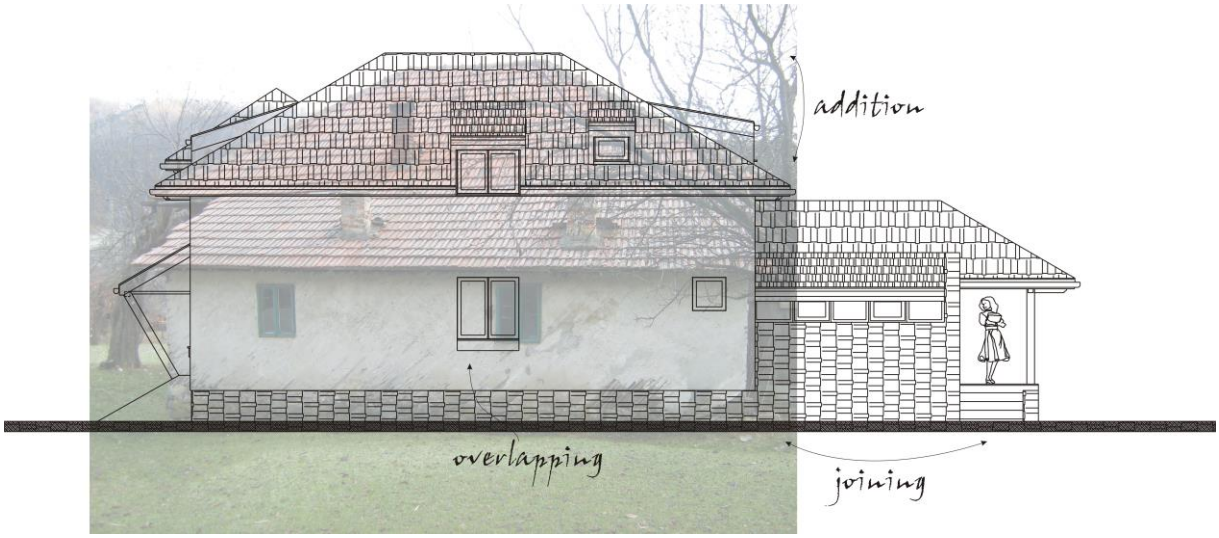


9. Intervention

5.2.3 Limits

There is generally accepted today the opinion that almost anything old is worth being kept, as a consequence of its natural development full of energy and significance acquired over time. Most of new interventions are accepted within some legal, practical or conceptual limits.

This project didn't depend on legal limits as no building permit was asked. The practical limits were fixed more by the short budget than the physical state of the building or the technologies needed to be used. On the other hand, the conceptual limits which are often more delicate and derive from the architect point of view, pushed the intervention to the direction of rather natural than striking transformation.



10. Intervention

5.3 Step Three (the Intervention)

Revival, which means the perpetuation of architectural elements recognized and recovered by exploiting their ability to adapt, change and regenerate in a practical and aesthetic way. The term "intervention" added to this step should be read more as the interpretation of the result than the process itself.

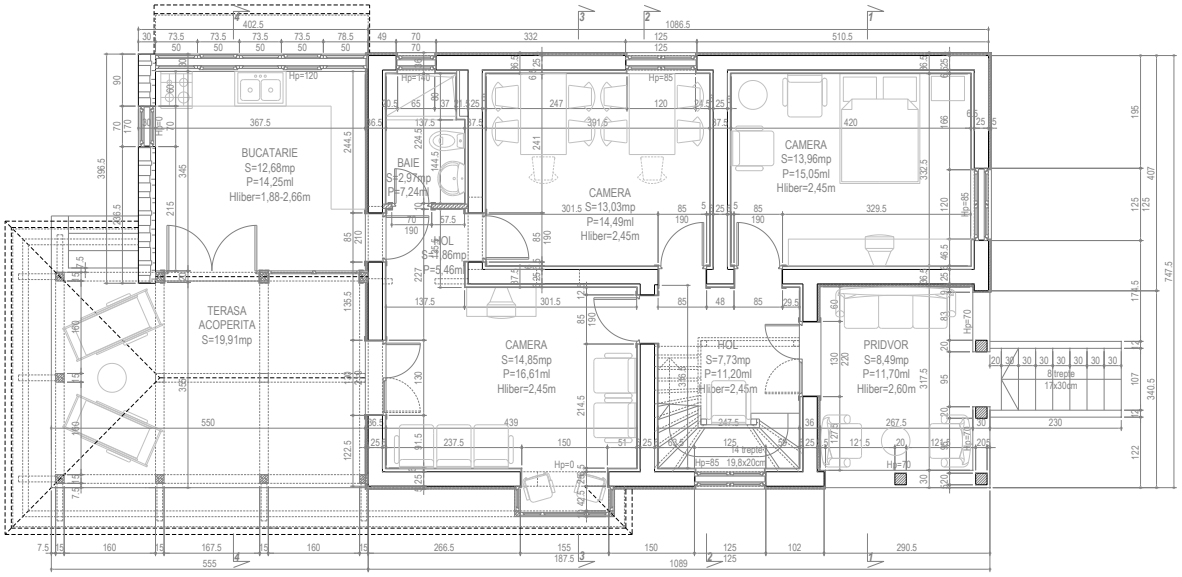
We should be aware that the moment of intervention finds the old with its own sequence of past transformations: it is the result of the moment. The completion of the new work puts us in front of the new result; it is a good time for judging it. Over time, the result of this ended process becomes the "existing old" on which another architect assigned with a new task would eventually work.

5.3.1 Old

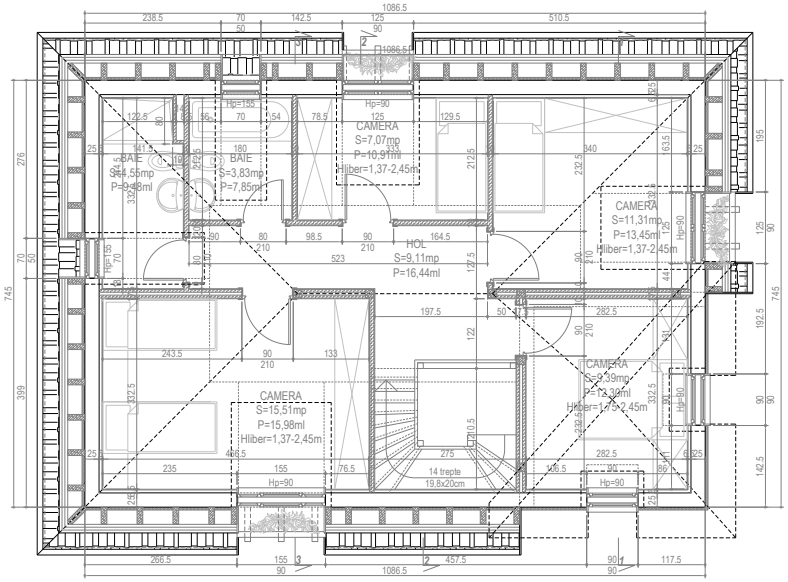
The house kept as a whole gains new life and utility.

Adding new spaces and volumes serves the new function as a summer painting camp for children: a common room opened to the covered terrace, dining room, several bedrooms in the attic, kitchen, bathrooms, etc...

Architecture gains new meaning while keeping into tradition.



11. Main floor



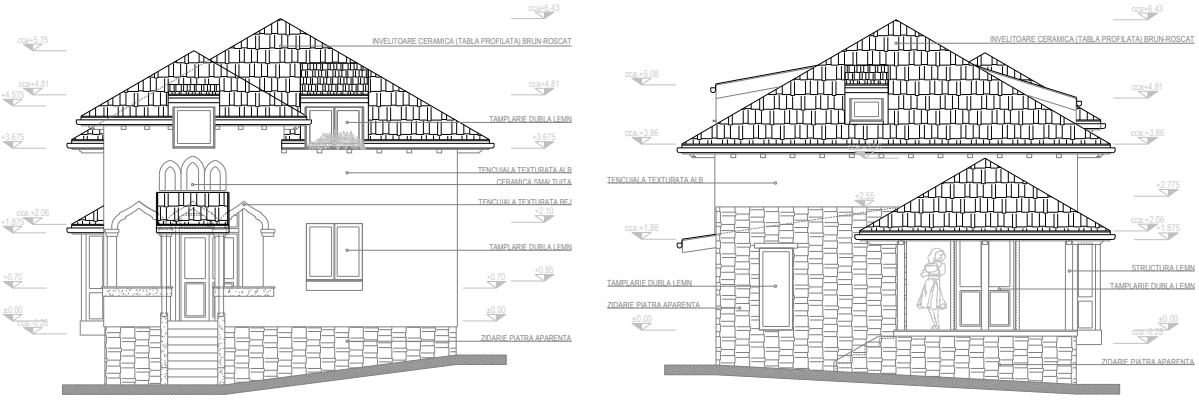
12. Attic floor

5.3.2 New

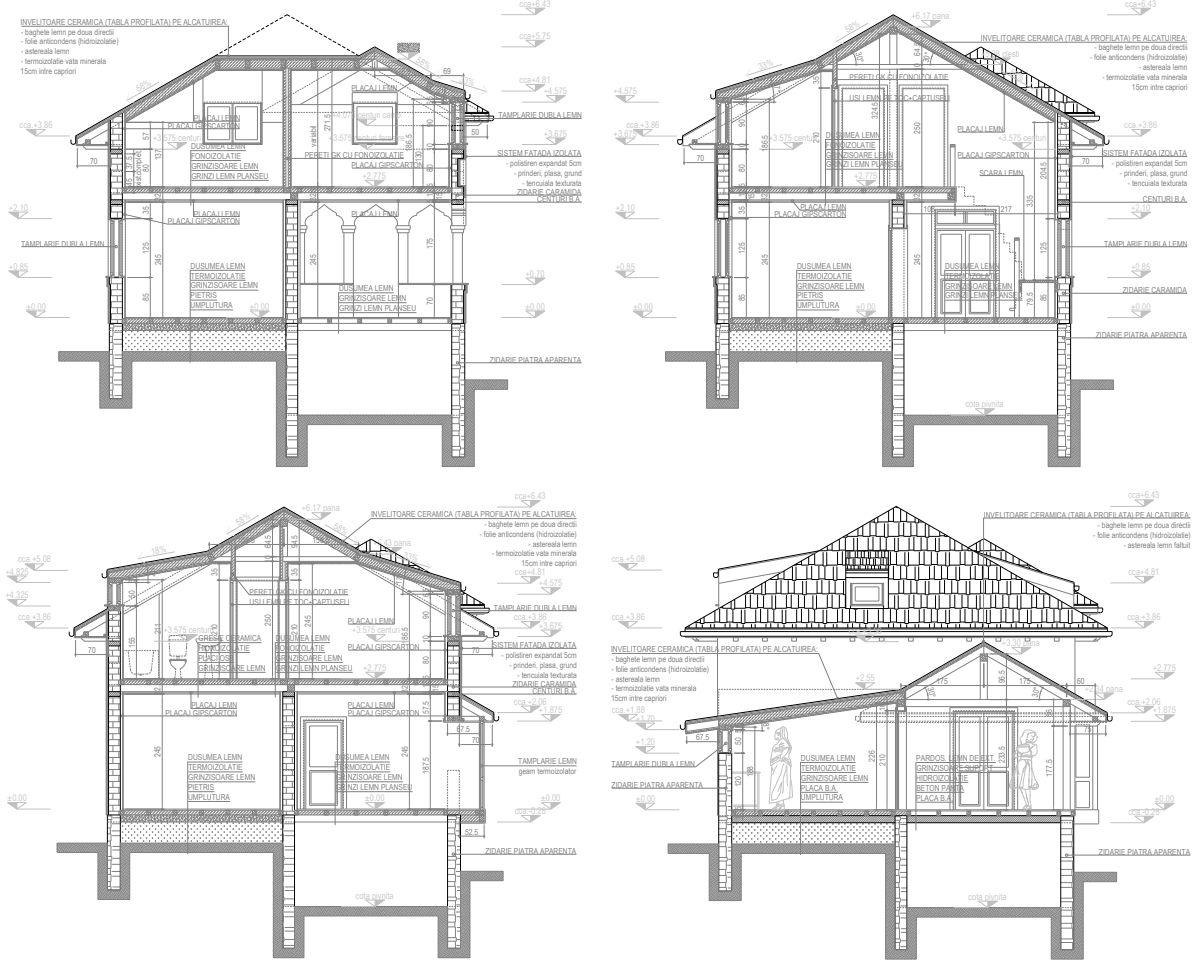
Intervention provides discreet force of expression by modern reuse of traditional architecture elements from the local and larger area.

The intervention uses decent means of overlapping methods for new openings connecting significant spaces to the outside, adding almost indistinguishable newly arranged attic and joining elements of protection and decoration.

The project suggests involving community by using local materials, techniques and labor.



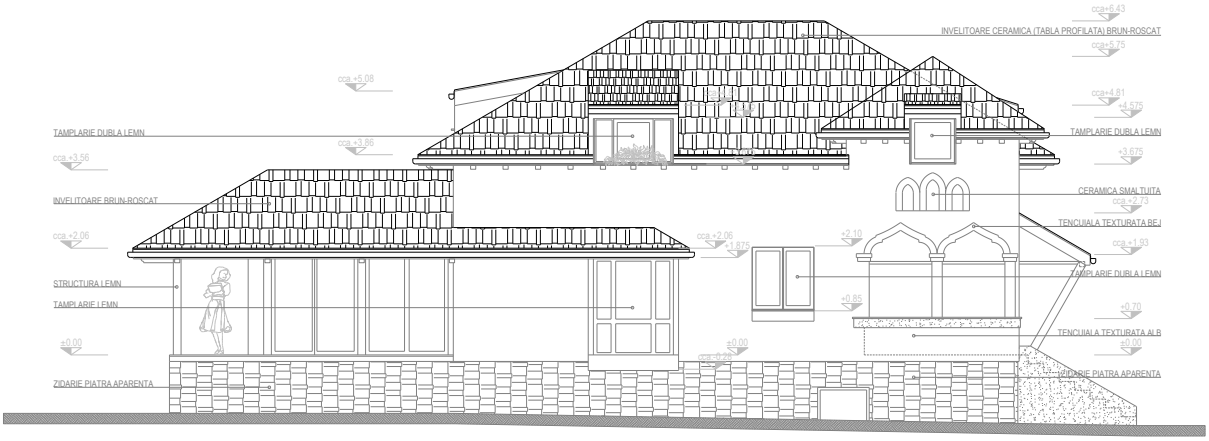
15. Side views



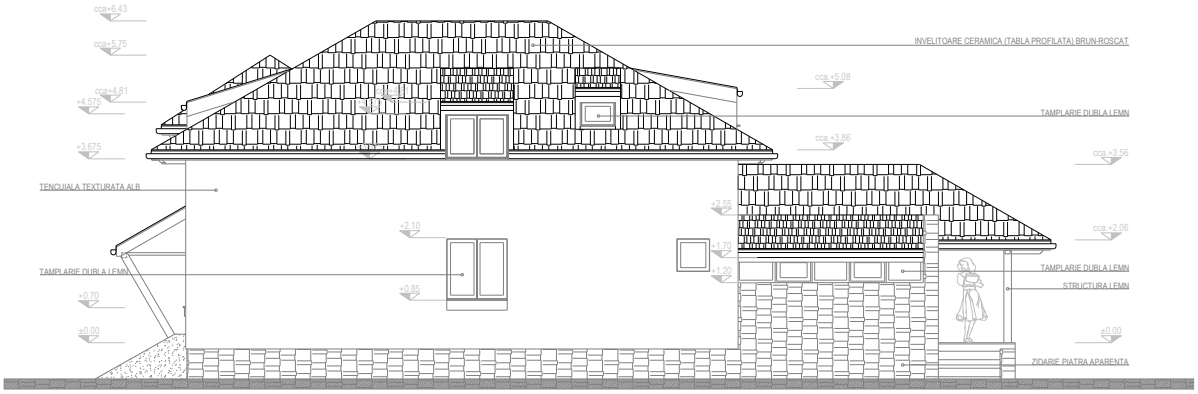
16. Cross sections

5.3.3 Continuity

The intervention is more oriented to the re-interpreted past than striking new. The respect of tradition and the recognition, regain and revival of the above mentioned valuable elements leads to sustainability and continuity.



17. Front view downhill



18. Front view uphill

6 THE OUTCOME

The result of the research and design process is a reflection of those initial criteria and methods. It should reflect the strong belief that even in this computer generated powerful images era, tradition stands above commercial and value above performance.

19. From old to new

3 STEPS FROM LAND TO HOUSE[1]

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Abstract

The practical approach of the project is based on a personal theoretical model of intervention in the existing environment, may it be natural or built, seen as a process with certain stages that can be identified as being the same no matter the situation.

The conceptual approach is that of using traditional-historical elements from existing architecture in order to build within strong cultural areas.

Preparing the steps means building the program according to the objective needs and to the personal believes. It means having some pre-defined criteria of intervention and guessing the methods that will become clearer along the way.

Step One

Acknowledgement, stage of analyzing the existing environment, based on a combination of factors and criteria that make it possible identifying (on one hand) elements with a certain importance, consequently the recognition of their value (on the other hand).

Step Two

Retrieving (in terms of recovery / regaining) the valuable elements recognized before, put together by insertion of meaningful architecture in the land.

Step Three

Revival of the natural and cultural assets through intervention (architecture), which can valorize their possibilities of regeneration within unchangeable values, while adding its own.

The intervention is more oriented to the re-interpreted past than striking new. The respect of tradition and the recognition, regain and revival of the above mentioned valuable elements leads to sustainability and continuity.

The result of the research and design process is a reflection of those initial criteria and methods. It should reflect the strong belief that even in this computer generated powerful images era, tradition stands above commercial and value above performance.

Keywords: Intervention, process, natural environment, tradition.

[1] This presentation and the one called "3 Steps from Old to New" are part of the same concept, two sides of the same research.

A study on a guest house for cave explorers and divers, Isverna, Mehedinți

"This is not great or original architecture, nor is it trying to be. It is a modest attempt to get things right by following patterns and examples laid down by tradition. This is not nostalgia, but knowledge passed on from age to age."

Roger Scruton – "Why Beauty Matters"

1 ARGUMENT

I don't know how comes that almost all the old buildings are "beautiful", even the modest traditional rural ones; people who say that "you don't see much of this today" are probably right. Contemporary times do not allow the rest for this kind of edification anymore: aesthetic criteria have changed; there is a tendency towards efficiency and profitability, for the beauty of performing technologies, an essentiality of concepts.

Francoise Choay speaks about "the loss of our competence to build", but I believe that few architects would anyway dare to build something new in the old style, even allusive, without the fear of ridicule.

Yet many of the beneficiaries of our architecture are longing to live rather the glowing version of the past than the present. So maybe an open mind, a clear eye, a sensitive approach and a decent touch would make a way.

2 THE PHYSICAL CONTEXT

In the village of Isverna from Mehedinți County there is a unique natural element: Isverna flooded cave, an attraction for amateur and professional cavers who can do here surface and, especially, underwater exploring. In 1990, with the support of J.Y.Cousteau, the cave was declared a nature reserve of European value and is currently in custody of the Underwater Exploration and Speleological Group.

1. Isverna flooded cave

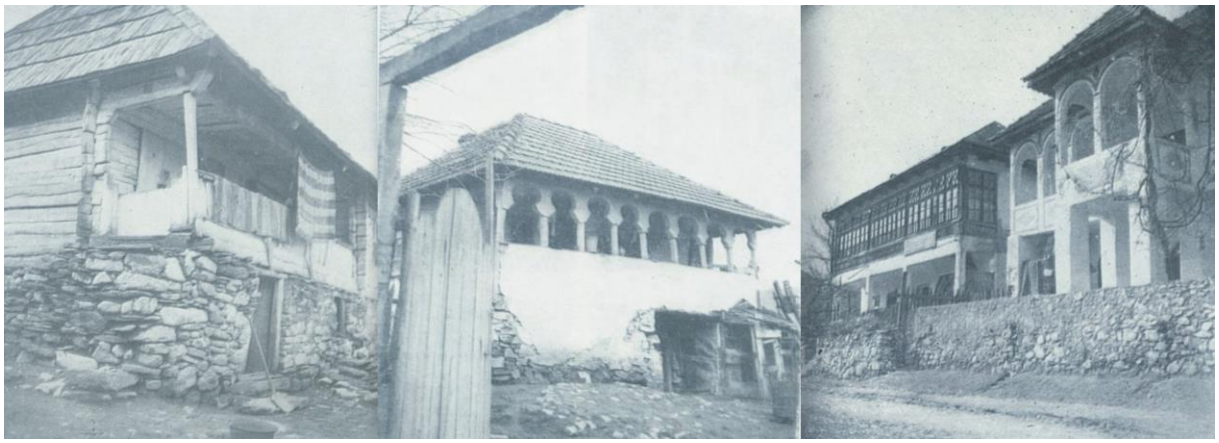
On a plot located opposite the entrance to the cave, over the brook called "Cave Water" which springs from it, the group wanted to establish a boarding house with semi-private use, which was meant to support their caving activities and would include common spaces for group activities and meal, room accommodation and spaces for diving equipment. The land is

located in the west of the village, in a special place called "Village Head" and descends towards the water in a variable slope.

2. The land

3 THE CULTURAL CONTEXT

Mehedinţi County – along with Olt, Dolj, Gorj and Vâlcea counties – is part of Oltenia region, a well-defined cultural area, the homeland of Constantin Brâncuşi and of the fortified "cula" houses. The traditional architecture provides so powerful references that almost lays at hand a way to build even now-a-days.



3. Mehedinţi traditional architecture

4 THE APPROACH

The practical approach of the project is based on a personal theoretical model of intervention in the existing environment, may it be natural or built, seen as a process with certain stages that can be identified as being the same no matter the situation.

The conceptual approach is that of using traditional-historical elements from existing architecture in order to build within strong cultural areas.

4. Cartianu house, Cartiu, Gorj

5 THE PROCESS

Preparing the steps means building the program according to the objective needs and to the personal believes. It means having some pre-defined criteria of intervention and guessing the methods that will become clearer along the way.

5.1 Step One (the Research)

Acknowledgement, stage of analyzing the existing environment, based on a combination of factors and criteria that make it possible identifying (on one hand) elements with a certain importance, consequently the recognition of their value (on the other hand). In this case:

5.1.1 The site

The site itself is a privileged place at the end of the village, just across the entrance into the cave. The research points out its valuable topography, orientation and position.

5. Village Head (End)

5.1.2 The landscape

The landscape (village included) is both geographical and cultural valuable. Local architecture blends into the hill-and-valley surrounding, along with natural elements like stone passages and bridges in the region.

6. Corcoaia Gorge

5.1.3 The cave

The flooded cave is a natural monument of European value, renowned for its speleological importance in surface and underwater exploring. It proved to be the major existing element that the project concept should focus on.

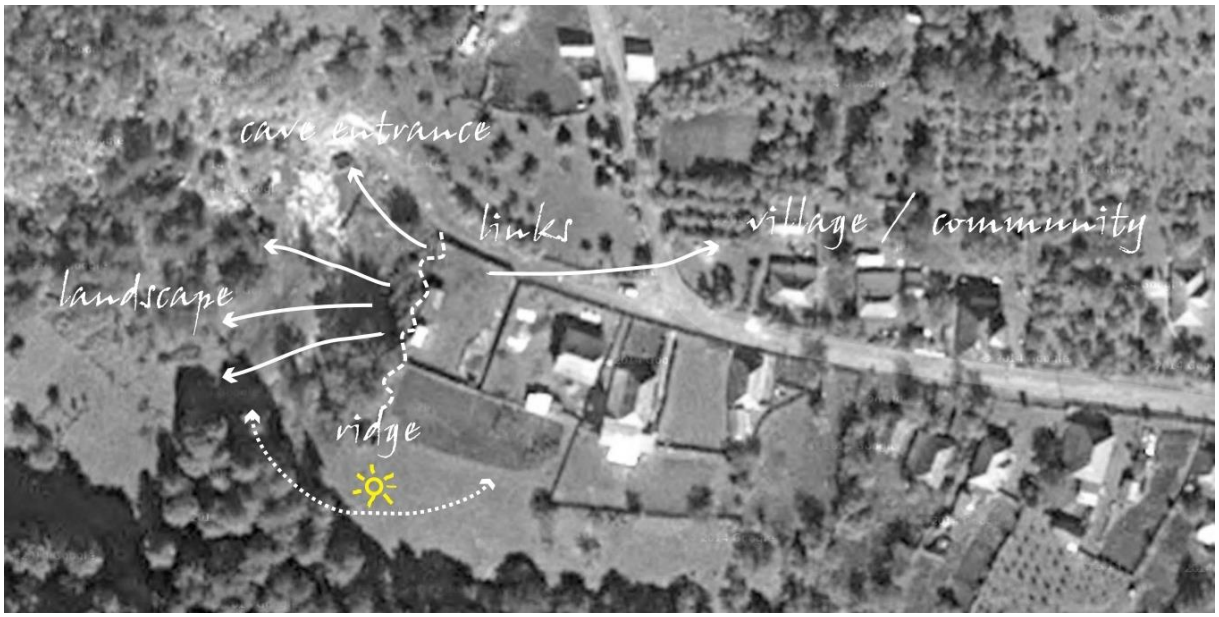
7. The cave entrance seen from the site

5.2 Step Two (the Project)

Retrieving (in terms of recovery / regaining) the valuable elements recognized before, put together by insertion of meaningful architecture in the land:

5.2.1 Links

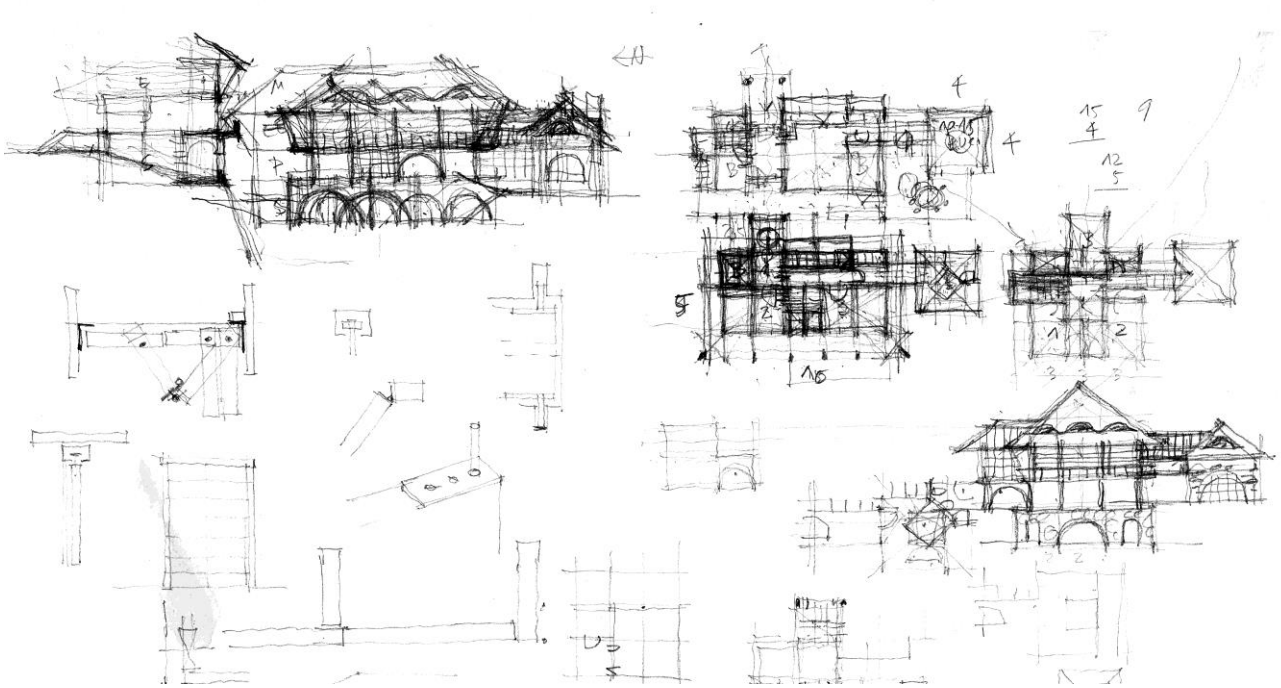
Architecture links the village to the site and orient interest to the most precious element of the existing natural environment, the cave. The proposal involves community in using local materials, techniques and labor.



8. Site links

5.2.2 Tradition

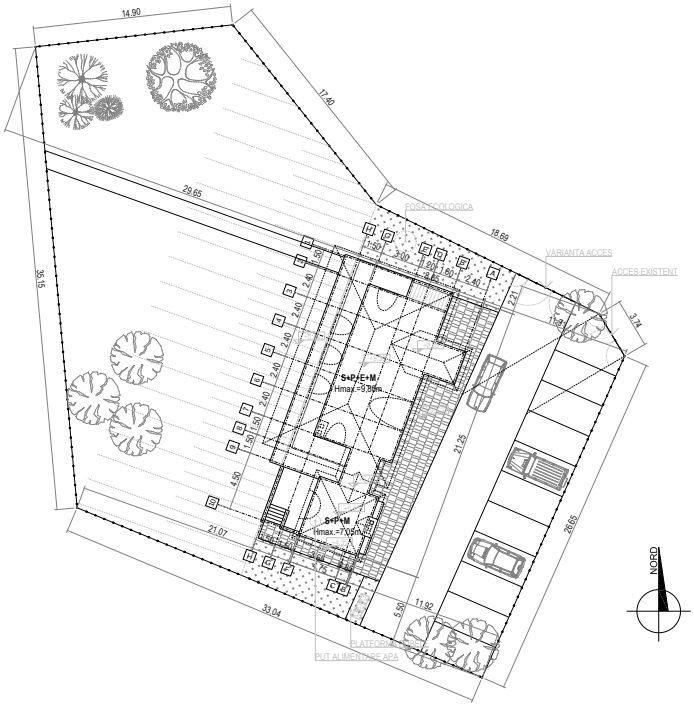
Architecture brings in traditional references meant to be familiar in the local area. The project makes use of volume composition, outside/transition/inside spaces, construction materials and expression extracted from the most valuable examples of traditional architecture in the larger area.



9. Concept thumbnail sketches

5.2.3 Place

The empty "field" becomes a place. The "house" fits in the scale of the place. The place becomes part of the community.



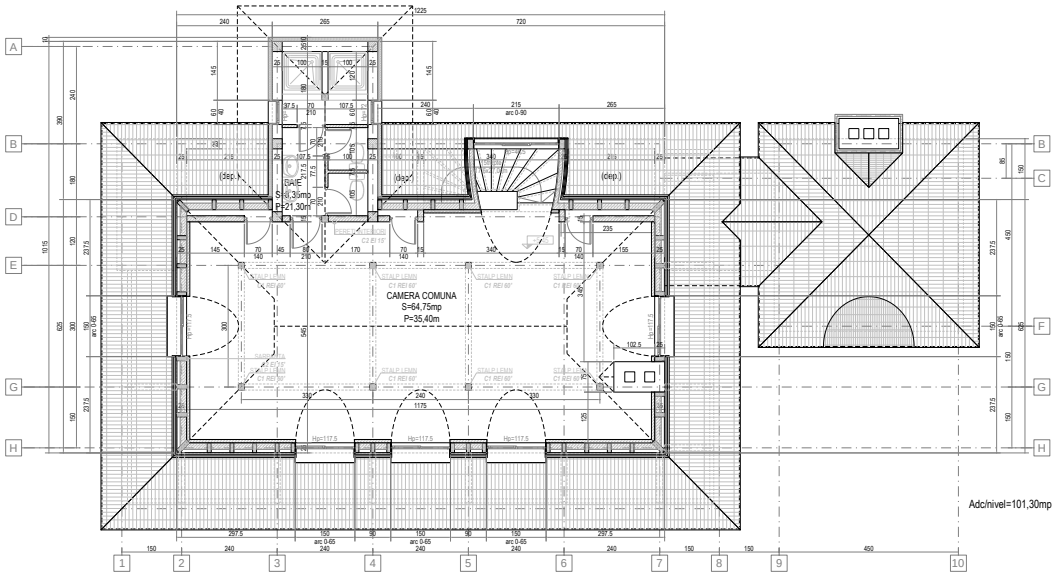
10. Site plan

5.3 Step Three (the Intervention)

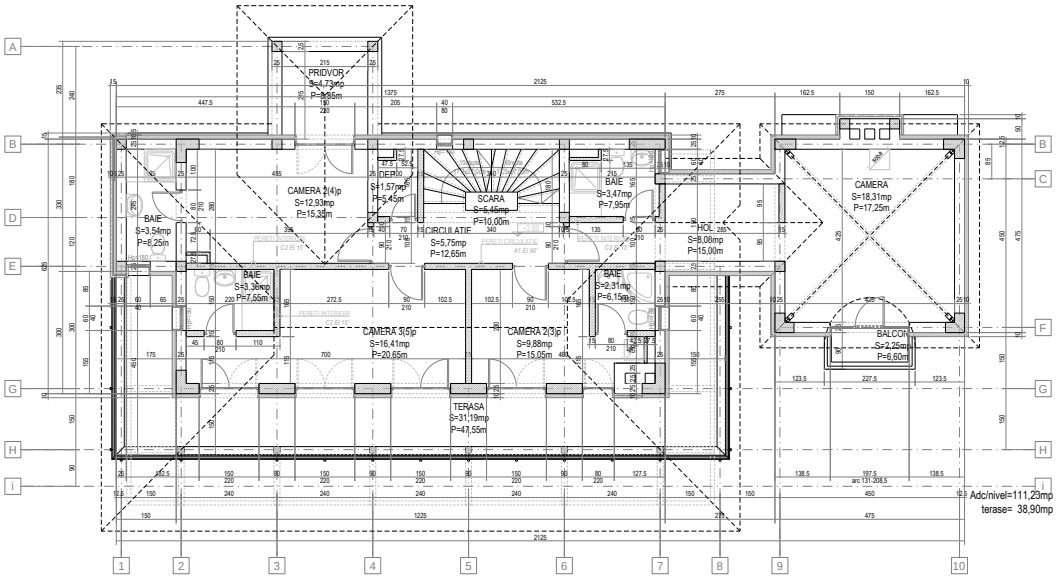
Revival of the natural and cultural assets through intervention (architecture), which can valorize their possibilities of regeneration within unchangeable values, while adding its own:

5.3.1 Meaning

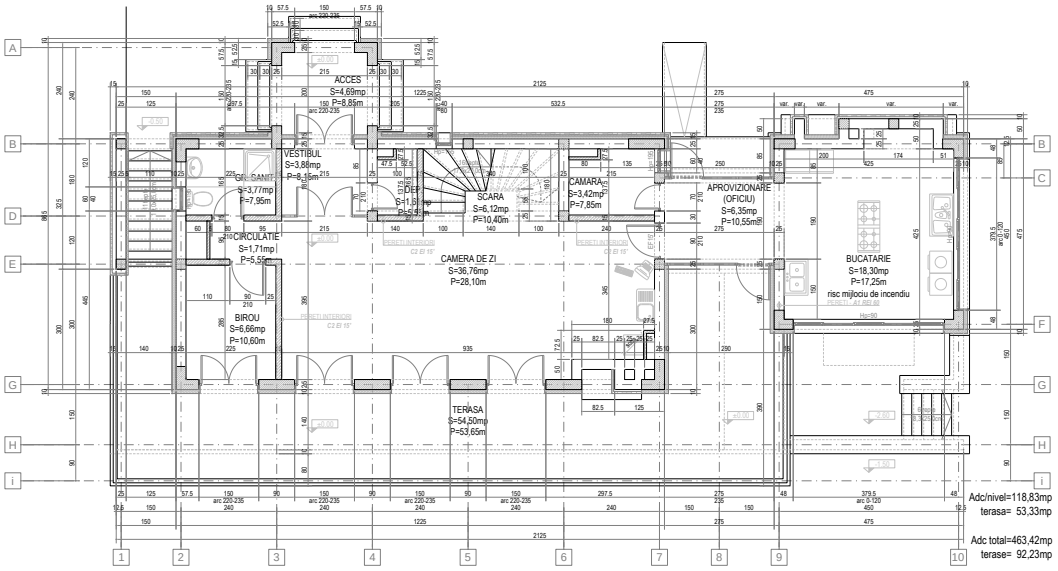
Architecture gives meaning to the land by introducing utility. The new building provides support for the natural attraction and increases the tourism potential of the place.



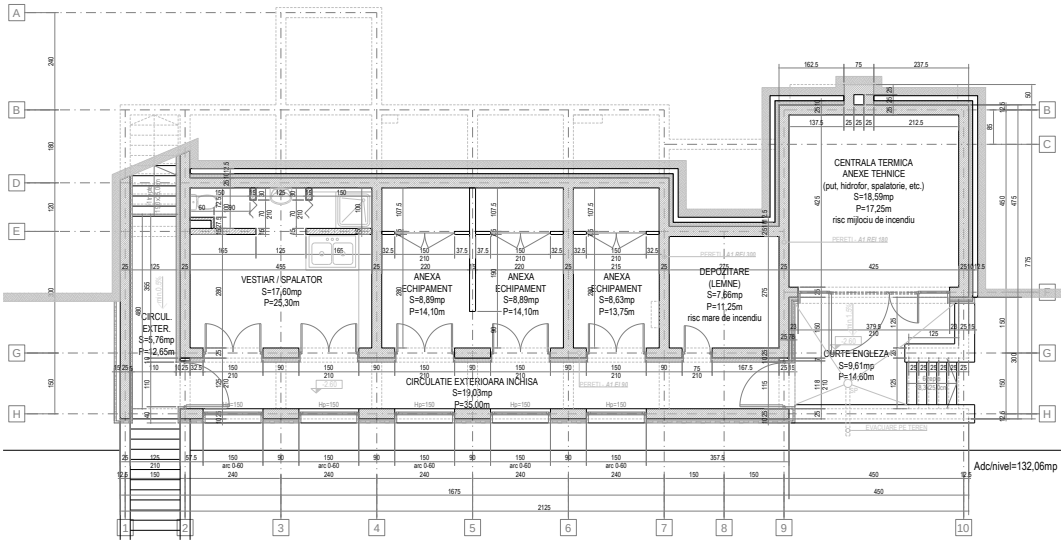
11. Attic floor



12. First floor



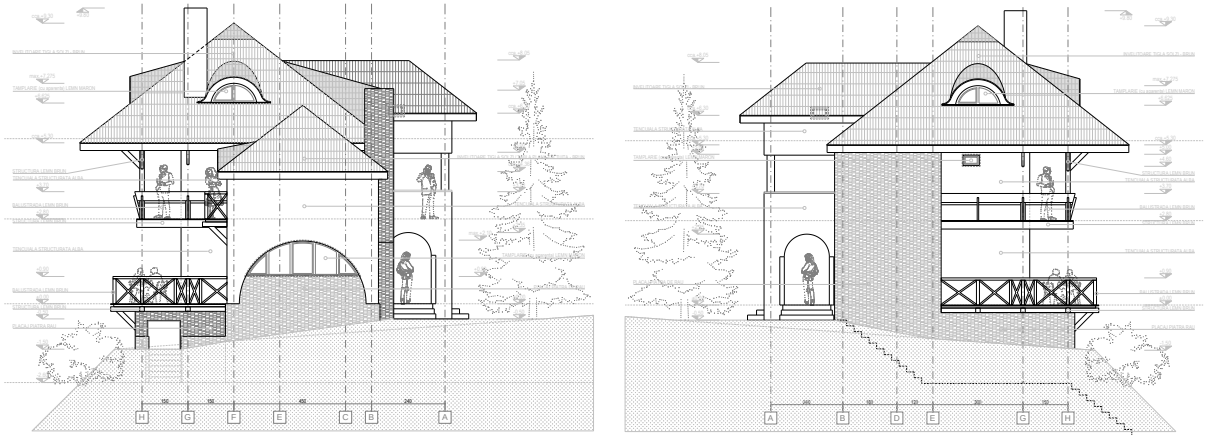
13. Ground floor



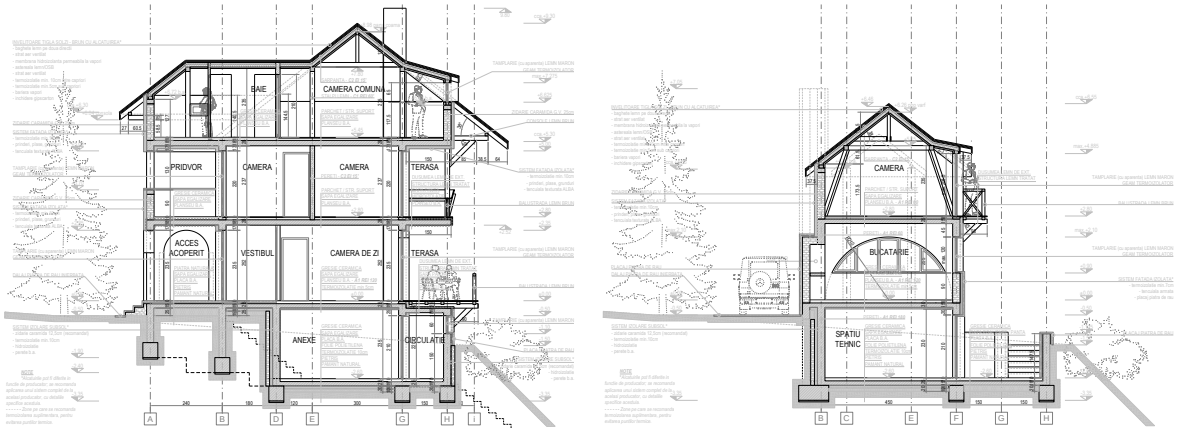
14. Basement floor

5.3.2 Architecture

Architecture claims itself, while keeping a respectful balance with the environment. The two-volume “house” stands visible on the site ridge, occupies rationally the plot and makes use of the field slope. It is firmly oriented to the cave, while offering the main access to the village and opening to the view and sunlight.



15. Side views

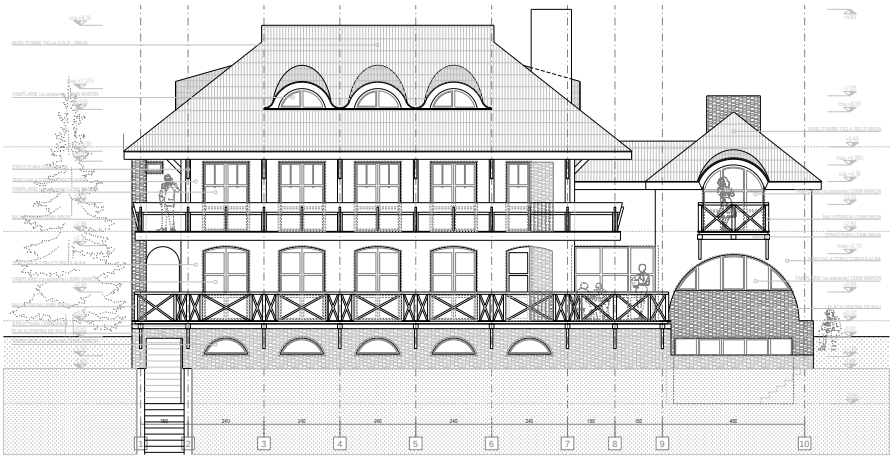


16. Cross sections

5.3.3 Continuity

The intervention is more oriented to the re-interpreted past than striking new. The respect of tradition and the recognition, regain and revival of the above mentioned valuable elements leads to sustainability and continuity.

17. Entrance view from the village



18. Front view from the cave / valley

6 THE OUTCOME

The study developed into a project drawn up to the building details. The client, the promoter and the authorities assimilated it as a favorable intervention for the local community. It eventually stood by due to the lack of European funding.

The result of the research and design process is a reflection of those initial criteria and methods. It should reflect the strong belief that even in this computer generated powerful images era, tradition stands above commercial and value above performance.

19. From land to house

THE NECESSITY OF THE TACTILE DIMENSION IN THE ARCHITECTURAL EDUCATION

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Abstract

Contemporary architecture has become an ambiguous play of transparencies. Due to the decoding difficulties, the individual for whom it was built starts feeling alienated. This consequence is generated by the nature of the approach that the architects have regarding the built environment. Often enough specialists tend to focus only on the visual aspects, and neglect the material substance of the building, thus creating an impersonal architecture. Computer representations, some of them so precise, treat buildings as mainly visual objects. They do not take into account the tangible characteristics of the spaces we live in. Ignoring gravity and materials' properties generates a lack of stability and security and leads to the alienation of architecture from its users.

In the past the study of architecture implied a proper knowledge of materials, both in terms of efforts, the way in which they evolve through time and their significance. The evolution determined by the Industrial Revolution generated new products which themselves created new ways of building. Furthermore, the new tools available to architects did not bring only benefits, but affected the physical relationship established between the creator and the art of building which became too superficial. Education in architecture should focus on the study and the understanding of the relationship between the architectural space and its users. We perceive the architectural space by means of our body which represents the centre of our perception. Moreover, the interaction between architecture and the individuals has not only a visual nature but a tactile-kinaesthetic nature too. Phenomenology specialists have been drawing attention to the importance of the senses in architecture, both in terms of perception and in the design of the architectural space. Architects conceive spaces based on their past experiences, their memory influencing the choice of materials and textures, understood as components of a larger concept - the tactile dimension. Our skin comes into direct contact with architecture's shell, and touching implies both the existence of the tactile component and of the kinaesthetic one. We touch to experience, to verify and to create architecture. Without touching we are not able to profoundly understand the architectural object which is essentially a living body. Based on this direct relationship, we, as human beings, perceive the tangible aspects pertaining to the architectural space. The expressive images that are used in architectural education are not sufficient to express the essence and the stability that the building environment possesses. From our point of view, the decoding of the architectural space cannot be reduced to volume decomposition, since it should actually start from the consequences that the surfaces' qualities have on individuals. The vocabulary of architects to be should be based on a profound knowledge of materials and their metamorphosis. This is possible only with a deep understanding of the implications of the built environment that can be obtained only through a tactile relationship. Memory is able to connect us to past experiences, to characteristics felt before, based on a tactile exploration. This is why we are apt to feel the qualities of space just by seeing surfaces, without actually having to touch them.

Thus, the aim of the paper is to draw attention to the importance of the tactile component in the study of architecture, emphasizing that it is necessary for specialists to be aware of the implications that the built environment has on its users.

Keywords: Tactile, education, surfaces, materials, textures.

1 INTRODUCTION

Architecture has become merely a visual art in the last century. For ages it represented stability and permanence but now, influenced by the new technologies it is concerned mostly with powerful images based on transparencies and reflections[1], innovation and technical aspects. One might say that this is how things should evolve, but we have to take into account that we as human beings have a physical relationship with the architectural body, not only a visual one.

Architects belonging to the phenomenological approach discuss about the loss of sensibility characterizing the built environment over the last decades. This is generated from our point of view by the superficial relationship that architects, as creators, have with their creations, the architectural objects. As a result we may argue about the lack of connection between the contemporary buildings and their users. Fig. 1, Fig. 2.

The technological revolution that started decades ago has influenced not only the way architecture was built, but also the way it was conceived and represented. Hand drawings and models were greatly replaced by renders and 3Ds generated by computer. Because of this, the way architecture is taught changed dramatically. The implications of this new approach facilitated by computer generated both positive and negative aspects. It is true that in terms of time everything is improved, but a lack of sensibility has ensued. This diminished the intimacy between senses and architecture, because the new representations deal merely with visual aspects and forget to take into account the tangible aspects of architecture.

It is important for future architects to be conscious not only of the qualities of a good architectural image but of the qualities of a good architectural space, defined by its material boundaries. By this we understand a whole collection of characteristics that refer especially to the tactile dimension.

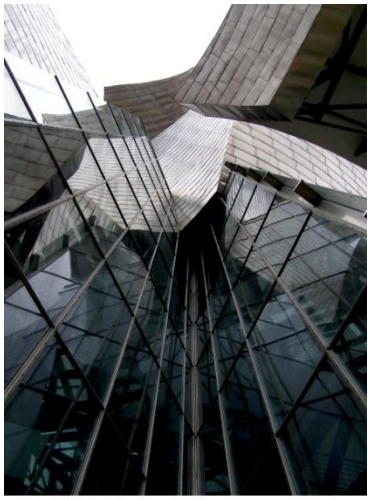

Fig. 1 The Guggenheim Museum Bilbao - architect F. Gehry - photo: A. Vișan - 2009;
Fig. 2 Interior view from The Science Museum London - photo: A. Vișan - 2013;

2 ARCHITECTURAL EDUCATION

In the study of architecture students have to learn to express most of their ideas through drawings. Volumes and proportions are some of the first things that an architect to be has to

[1] As Juhani Pallasmaa emphasize in his most known work *The eyes of the skin (2005)* : "*Transparency and sensations of weightlessness and flotation are central themes in modern art and architecture."*

discover and to understand. It is true that the visual aspects are really important in the study of architecture, but the built environment possesses tangible qualities that have to be explored in a profound way. Computer representations are very useful these days, but before generating 3Ds, that in the vast majority of cases ignore gravity, one has to understand the laws that governed architecture for centuries.

As Pallasmaa argues: *"The computer creates a distance between the maker and the object, whereas drawing by hand as well as model-making put the designer into a haptic contact with the object or space"* [1]. A weak connection with the future object implies a superficial understanding of the building that is being conceived. The vast majority of students is/are fascinated by the amazing power possessed by computers. It is quite normal considering of the era in which we live in. Problems appear mainly when students from the first year begin using technology before having a good understanding how architecture should fulfil its function. Without realising what are the laws that govern the world of architecture, future architects are not fully conscious of the consequences of their work. Nowadays we could not imagine contemporary architecture projects without 3d or 2d representations realised using computer programmes. These amazing tools alleviate our daily work and help us to accurately express the characteristics of our creations. As mentioned before, sometimes future architects are being deceived by their tools, tools that start to govern them. Fig. 3, Fig. 4.

Fig. 3 Ronchamp - architect Le Corbusier - watercolour : A. Vişan - 2009;
Fig. 4 House 3D representation - photo: A. Vişan - 2015;

Architecture has an important function and is able to influence how life takes place. This is why good architects should be conscious of the way their creations affect users' lives. One should realise what architecture implies not only through the means of his or her eyes, but through his or hers whole body and mind, because imagination and memory play an important part in the decoding of the architectural space. The body moves through space, decodes its characteristics and determines a way of acting in the architectural space.

2.1 Personal Memories

There are various opinions about how architecture should be taught, but we have to take into account that a future architect's first contact with the built environment it is not related to his or hers first academic year, but with the very first memories of his life. We get into contact with the qualities of the architectural space the moment we are born, but the first memories regarding the built environment belong to our childhood. What is really interesting is that we get to know architecture without even realising what is happening. The Swiss architect Peter Zumthor agrees that: *"There was a time when I experienced architecture without thinking about it"* [2] and that his childhood memories posses *"the deepest architectural experience"* [3]. It appears that the relationship between a human being and the built environment is a personal though a subjective one.

We might say that each of us has his own way of understanding the elements that define the architectural space. As Juhani Pallasmaa argues: *"We have an innate capacity for remembering and imagining places. Perception, memory and imagination are in constant interaction"* [4]. All our life is influenced by our past experiences that determine the way we act in the architectural space. An important part in the knowledge process is played by the education of our senses. Exploring helps accumulating a variety of experiences that can

inform us of the qualities of the architectural space just by seeing the surfaces that generated them. As mentioned before, our relation with architecture is not only a visual one, but as Peter Zumthor argues: *"Architecture has its own realm. It has a physical relationship with life"* [5]. Understanding this type of connection has to do with all the aspects that architecture implies, a decoding that involves our body and all its actions.

2.2 Education

Before understanding the way things are built, the architect to be has to feel with his or hers body the implications of the built environment. We, as human beings, measure the architectural object through the mean of our body which facilitates our movement through space. It is true that in the first decoding phase our eyes are the tools used to read the world, but after this we explore the built environment through the mean of our whole body.

At the beginning of the university one has to be able to represent what he or she sees. Seeing is not everything because architecture is perceived through our five senses. As Peter Zumthor argues: *"To experience architecture in the concrete way means to touch, see, hear and smell it"* [6]. From our point of view a good architect should take into account the physical relationship established between him or her and the built environment. This supports the fact that the architectural space is a material one and not only a graphic representation.

A good drawer is not always a good architect because an architectural object is a really complex one and *"architecture is image only in a drawing or photograph. As soon as it is built it becomes the scene and sometimes the scenario of comings and goings of gestures, even of a succession of sensations"* [7]. One has to understand that building is a profound process. Good architecture results from a profound act of creation that involves the laws of gravity, science of materials and not just visual aspects. The problem is that sometimes students dominated by the beauty of the architectural images generated by computers forget to confront their personal/human experiences with the building that they design. We don't experience the built environment through a computer screen but in a direct way. In accordance to this we find relevant to refer to what Zumthor argues: *"Students have to learn to work consciously with their personal biographical experiences of architecture"* [8]. This idea is found in Pallasmaa's writings too which thinks that *"A wise architect works with his/her entire body and sense of self"* [9].

In many of the architecture schools students are trained only to see and imagine things, but, as mentioned before, this is not enough. Pierre von Meiss argues that in school a student is trained *"to perceive consciously the appearance"* [10]. Von Meiss's opinion is revealing for what should involve an architecture education. The word consciously refers to all the implications of the built object, understanding by this the tangible qualities of the architectural space. In our opinion these qualities do not refers only to the volumes that define the space but to the materials used to build them.

3 MATERIALS' EVOLUTION

Without materials it is impossible for architecture to become a real object. Human civilization evolved through time, based on the discovery of new materials that generated new ways of construction.[2] Materials are important and as Mark Miodovnik says *"although the materials*

[2] *"The fundamental importance of materials to us is apparent from the names we have used to categorize the stages of civilization- the Stone Age, Bronze Age and Iron Age- with each new era of human existence being brought about by a new material". see [11] Mark Miodownik pp. 5-6.*

around us might seem like blobs of differently coloured matter, they are in fact much more than that: they are complex expressions of human needs and desires" [11].

For hundreds of years architecture has been built using stable materials and taking into account the laws of gravity. The Industrial Revolution generated the creation of new products that changed radically the building industry. Nowadays new materials are invented every day, each of them with special characteristics. The problem is that if an architect to be has not the proper knowledge regarding the way they behave and the way in which they modify the perception of space, as a result of the lack of knowledge or information, the architectural object doesn't fulfil its function properly. It is not enough to choose a material taking into account only its visual characteristics. There is an important need to understand profoundly the uses and the properties of the elements employed for building architectural spaces. From Peter's Zumthor point of view, in the process of creating architecture using materials, architects have to *"learn to handle them with awareness"* [12].

The study of building materials is a subject that evolves every day and has to do with all the aspects of life. There are many ways of classifying materials, but the most common classification regards the origin that these products possess. Natural or artificial, they made possible the construction of the architectural space for ages. Juhani Pallasmaa has a special approach regarding building materials. In his opinion, natural materials posses a great sensibility *"stone, brick and wood - allow our vision to penetrate their surfaces and enable us to become convinced of the veracity of matter. Natural materials express their age and history, as well as the story of their origins and their history of human use"* [13]. Nowadays there are many controversial opinions concerning the differences between natural and artificial materials. They all have their advantages and disadvantages, and even if they change with the passing of time or not, they have to respond to the needs of the architectural space users. Students should understand the way materials can define the space and to learn to appreciate the expressivity and the properties possessed by the building products and to understand their use, because: *"Each material is used within its own work logic"* [14].

4 THE TACTILE APPROACH[3]

As shown before, architecture depends on the materials that are used in its construction. Their properties and appearance change the way the architectural space is perceived. In the years spent in an architecture school, one should get familiar with the implications that the products used to construct the built environment have on their users.

Materials have properties that address to all our senses and not only to the eyes. Many architectural critics argue that the eye can be deceived while truth and profound aspects can be established only by the use of touch. One is not able to perceive the built environment by isolating one of the senses because they collaborate and construct the ensemble of the object. Our relationship with architecture is not only a visual one, our skin detects the temperature of a space, while our hands can almost feel the texture and the structure of an object just by seeing it *"paradoxically we have already unconsciously touched the surface before we become aware of its visual characteristics; we understand its texture, hardness, temperature, moisture, instantaneously"* [15]. Touch helps us to establish the true nature of things. One should be concerned with the full implications that the tactile dimension possesses in architecture. By this we not only understand the sensations perceived while touching a

[3] The concepts regarding the tactile approach were introduced in the Phd. thesis entitled "The tactile-kinaesthetic perception of the architectural space" (A. Vişan, 2014);

surface, but all the past experiences that involved similar materials or objects and the sense of touch.

4.1 The interaction

Between architecture and its users there is a physical relationship. Interaction best describes what happens between the built object and the human body. Each of them influences the others existence, leaving traces. Our skin is able to record characteristics that our eyes cannot read at first sight. It is true that in our society visual aspect plays an important part, but architecture's role is a functional one, acting primarily as a shelter. Not only volumes and shapes influence the way we move and feel/react in the built environment, but products and materials. As well we move through space and our skin detects a variety of characteristics belonging to the built environment without even a direct contact. Each of our steps helps decode our environment and tells us how we should react. First we perceive everything through our eyes, and after this using the other senses especially the tactile sense. Once we touched a material we are able to almost feel its characteristic just by seeing it. Fig. 5. There is a strong and profound connection between our senses that assure us of a good perception of the surrounding space.

Fig. 5 Hands touching surfaces - photomontage: A. Vișan - 2014;

4.2 The need for exploration

The educational process implies exploration. One cannot explore the built environment properly if one doesn't take into account aspects related to the whole. A student is not able to understand the material aspects of the architectural space if he or she is not allowed to explore, and by this we mean to touch. Our skin and hands as underlined before offer us information about the tangible characteristics of the objects that we see. When a person doesn't know what an object is made of, the person becomes curios and wants to establish the very nature of that thing. In the learning process exploration is a really important step. *"Tactility occupies a special place in architecture for two reasons: on one hand is inevitable because of gravity, and on the other it is anticipated by our ability to see forms and textures. ...it is not enough to just look at beautiful objects on display: we want to touch them, examine the weight and the textural quality of the surface and its form"* [16]. By touching we establish a strong connection between ourselves and the architecture's built body.

As reminded before, new materials are invented each day. In the study of materials in the architectural school, students have to assimilate a lot of technical information about a variety of products in a very short amount of time. There is no time for experiments and a profound understanding of things is not encouraged. We have to realise, as Pallasmaa argues that: *"The tactile sense connects us with time and tradition: through impressions of touch we shake the hands of countless generations"* [17]. It is not enough to see the image of materials, you have to touch them and to comprehend the way in which they are used in the act of building. Fig. 6.

Students should be advised and helped to decode profound aspects related to their field of interest. This is why they need to be aware of the implications that the use of materials has in the built environment. To learn you have to explore and to explore you need the proper materials, space and advice. As Pallasmaa underlines *"the task of the critical, profound and*

Fig. 6 Tactile Samples from Victoria&Albert Museum, London - photomontage: A. Vişan -2014;

responsible architect is to create and defend the sense of the real" [18].How can you defend what you don't know? Specialist or non-specialists we all have memories of architecture from our past experiences that were constructed as a mixture of visual and tactile. These types of memories influence the way we perceive and the way we act in the architectural space.

4.3 Tactile characteristics

From our point of view, materials are a really important subject in the study of architecture. Many of the students are able in their first and second years to enumerate only the basic products used in the construction field. It seems that there is no nearness between a future architect and the most important products that he or she is going to use to build the architectural space. This happens because the study of materials has focused too much on the technical aspects and forgot the fact that materials posses their own language.

A sensitive subject should be treated in a sensitive way, because: *"Materials also have symbolic significance: they evoke opulence or austerity, the ephemeral or the eternal, vegetable, mineral or artificial mixture, the private or the public, industrial or craft"* [19]. This is why we argue that the tactile dimension is a necessity in the study of architecture. Not all the types of stones, wood, metal plastic or glass are the same. Not only can their name differentiate them, but a variety of characteristics that are connected to their origin and the way the material was processed. We propose two perspectives that one could take into account when studying a material. The first one regards the nature of the material and the second one the way in which its surface it was processed. We shall call the first category profound tactile, that offers us information regarding aspects as cold/warm, soft/hard, dry/wet. These types of characteristics are the same for the same type of material possesses. They are perceived as different only when the surface was treated distinctly and in this case we can discuss of a superficial tactile. What the second perspective implies is well underlined by Pierre von Meiss, which argues that "*According to its surface treatment the same material will be smooth or rough, matt, satiny or shiny..."* [20]. The surface can be treated in a variety of ways emphasizing or not the internal structure of the material. A diversity of textures stimulate not only the eye, but ones sense of touch too.

Our skin and eyes are able to decode the profound and superficial characteristics of the architectural surfaces.

5 CONCLUSIONS

The study of architecture involves not only visual aspects but tactile aspects also. Even though we first see and just after this we enter into a direct contact with the built environment, its material characteristics affect the way we move and act through it. Studying architecture is similar to any learning process. If one is not able to understand what he or she sees, he or she

wants to touch and verify if there is any semblance between the image and the essence. Tactile devices remind us every day of the power possessed by the sense of touch. It is true that we live in a city dominated by images, but architecture has its tangible characteristics, and we as human beings have a physical relationship with the built environment. Wandering through the architectural space demands all our senses.

From our point of view a future architect has to be conscious of the implications that his creations might have on their users. He or she is not only responsible of creating a beautiful drawing or render but a good architectural space. Not always a beautiful architectural image is the equivalent of a cosy space this implies a good knowledge concerning the study of materials and their implications on the users' of the built environment. A deep understanding of the tactile dimension regards both a profound and a superficial tactility. In our opinion, a sensitive material space depends on the sensitive personal experiences that its creator - the architect - had with the built environment in the past, through his own tactile approac

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THE INFLUENCE OF COMPUTER-AIDED DESIGN ON TOPOGRAPHICAL ARCHITECTURE

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Abstract

Topographical architecture is the kind of architecture which allows the building to be perceived as topography, as a landform, as a part or a continuation of the land, as the result of a collaborative process and a close relationship between architecture and landscape. Topographical architecture is not an innovation of the contemporary world, but a rediscovery of the potential that nature and landscape may hold. The question that arises is: if topographical architecture seems to be one of the first forms of architecture, how is it that today this approach raises more problems than traditional tectonics?

This kind of architecture was seen as a way out of standards that became possible with the proliferation of media and design methods. Computer design generally influenced the design process of architecture, and for many architects it is no more than a speedy drawing instrument that allows easier modification, leading to standardization and precision at a larger scale. For others, it represents a way of taking architecture to another level, allowing the creation and visualization of a different class of architectural objects through 3D simulation. Beside this fact, computer softwares are also used for solving actual problems that arise with complex architectural geometries, by coping all data and translating them into the production technology for the production of building components.

Computer design systems present both advantages and disadvantages, that become visible only through experiments and especially through the proliferation of topographic projects. The major advantage of computer design is that it facilitates imagining architecture, creating a visual placeholder and it may also be a great help in the production technology of building components. Optimizing solutions in order to achieve accessibility of such architecture is worth the effort because, in terms of ecology and sustainability, topographical architecture is one of the most eficient forms of architecture, that restores and gives nature a just position in our everyday life.

Of course, this matter revealed also disadvantages. Regarding the design process, one disadvantage is that this approach may fall too much into the experimental and formal due to the variety of spectacular morphology we can achieve, which quite often have no real content. Also, even though the result seems to be a succes at the very beginning, one cannot predict the ultimate effects of construction on everyday life and how this is assimilated by its users. Another fact is that topographical architecture is a type of architecture more difficult to accept, more expensive due to the impossibility of standardization, more difficult to build and therefore is often avoided.

The idea of space and the perception of space in which we live have changed during the last decades. Therefore, some solutions that depend, to some extent, on computer design, can support the evolution of topographical architecture: harmonize architecture with the environment through the development of intelligent technical systems, viable from both ecologically and economically point of view, and an attempt of standardize the production techniques and not the buildings and their components.

Keywords: Virtual representation, creative freedom, complex configurations, topological surfaces, fluidity, flexibility, alternate nature, large-scale territory design.

1 DEFINING TOPOGRAPHICAL ARCHITECTURE

Topographical architecture is the result of a collaborative process and a close relationship between architecture and landscape and refers to configurations perceived as topography, as a landform, as a part or a continuation of the land. We are talking about a different kind of attitude regarding the natural site of the construction as opposed to that of the traditional tectonics. Variations of the landforms determine the spatial properties and the character of the landscape and the topographical architecture is a "domestication", a "cultivation" [1] of the site.

The twentieth century is the moment when the building returns to the earthly condition, which it had eluded for centuries, a trend supported especially by the development of intellectual, philosophical, ecological, social and technological impulses. Architectural theory mentions this approach as a trend that appeared around the 60s. However, this is not an innovation of the contemporary world, but a rediscovery, a takeover and a refinement of certain archetypes that emerge together with the idea of human community, long before the development of architecture as science and art of building. Although the contemporary architecture is much more advanced and is not generated by the same needs that mankind has had in the distant past, the question that arises is: if topographical architecture seems to be one of the first forms of architecture, how is it that today this approach raises more problems than traditional tectonics?

Some of the starting points of contemporary topographical architecture are on the one hand the desire to achieve another kind of configurations that adapt harmoniously to the context, whether natural or artificial, without creating discontinuity, and on the other hand the attempt to create an architecture able to cope with the rapid changes that characterize the present-day and our environment, which tends every day to turn from local into global. Globalization is the transformation of what was once local, requiring a radical change of mentality to face the challenges of the modern world. We cannot escape globalization and therefore a unity of the world should be restored, to reinvent the landscape, to create new territories. To create new alternative territories, architecture and urbanism require new strategies that can handle the complexity and fast changes of the environment. [2] We live in a constantly changing environment both in terms of natural and urban, but also economic, political, social and cultural. Therefore standardization it is not seen any more as a solution to all problems, and an attempt to define architecture as landscape is increasingly more pronounced. In the last decades, in Europe, ecology prevails over the traditional stylistics, topographical architecture being seen as an alternative to rescue the landscape. This is designed so as to have an minimum impact on the environment and even the to achieve a symbiotic relationship between architecture and the natural environment. Ecological thinking is also becoming an integral part of urbanism. New topographies that mimics nature are built, establishing a close relationship between natural and artificial.

When talking about topographical architecture, the relationship between building and landscape becomes novel. The landscape is no longer perceived as a neutral background meant to highlight the architecture, but the two components are interweaved. The built object dissolves in the landscape blurring the boundaries between the two. Thus computer design is a major advantage in imagining large scale topographical architecture, because the handling of the organic forms and of the materiality of the earth becomes impossible without virtual representations. Ever since the past century, topographical architecture was seen as a way out

of standards that became possible at urban or landscape scale with the proliferation of media and design methods.

2 DEFINING CAD

Computer-aided design (CAD) is one of the most important achievements of the last decades, which generally influenced the design process of architecture. If CAD is no more than a quicker drawing instrument that allows easier modification, leading to standardization and precision at a larger scale, for others, it represents a way of taking architecture to another level, allowing the creation and visualization of a different kind of architectural objects through 3D simulation.

CAD that does not involve 3D modeling precedes hand drawing, but both have similar effects, namely the standardization capacity, precision and mass production, as the drawing accelerate the production of architecture. When, in addition to digital design, there was the introduction of modeling - a more rapidly development of complex morphologies occurs and architecture types of increasingly complicated forms become possible, facilitating imagining a building or an assembly as a whole, regardless of its complexity.

Although CAD has made work easier for many architects, this is often seen as an engineering tool, a more advanced version of the two-dimensional hand drawing where drawn pieces are not pulled together, each one requiring modifying when a parameter changes. Therefore some architects prefer to work directly in a 3D environment, with real building elements created by applications that imitate the real building process, like Building Information Modeling (BIM) applications. BIM does not use lines, but construction elements defined parametrically, such as walls, doors, windows, tiles, pillars etc. To put it shortly, BIM is a well structured database, consisting of building elements that are relatively easy to use, which can be sized according to each situation. These applications generate similar models with the object to be built, which thus becomes easier to handle by the entire design team, and many of the adjacent elements to the project, such as quantities, geographic information, light analysis, spatial relationships, product features can be automatically generated. It is assumed that such a program reduces the risk of losing information in a complex project and also provides instantly a range of information needed for a better understanding of the project.

While CAD may be considered by some too engineering, BIM can be seen as a limitation, since it works with presets. What is certain is that to create complex geometries and visualize their relationships with the context, one or more design softweres are required and sometimes even animation softweres.

3D visualisation allows us to break free of orthogonal design and the customary forms of traditional architecture and try new possibilities and options. Instead of the usual design elements such as points, lines, horizontal and vertical planes, 3D modeling works with splines, nurbs and paths. Digital Design uses other elements than those usual in architecture, such as forces and vectors, trying to capture the movement, and the dynamic forms can be designed in association with the movement and the virtual forces. Thus traditional architectural elements like walls, roofs, doors, windows, as we know them are abandoned, introducing a novel creative freedom which allows for a design process that involves both architecture and environment, the two considered a whole.

Besides the fact that computer design facilitates producing virtual descriptions and simulations closer to reality, creating a visual placeholder, it is also used in solving actual problems that arise with complex architectural geometries. There are architects that use CAD not only in the design process, but also in the production of building components that are

achieved by cooperating all data and translating them into the production technology. The first visible step in production was 3D printing, which for the moment is limited in terms of both materials and sizes of objects that can be achieved. But the technology has reached an even more advanced level. Frank Gehry uses a software suit called CATIA (Computer Aided Three-dimensional Interactive Application), a platform that combines Computer-aided design with Computer-aided manufacturing and Computer-aided engineering, wherewith components for his buildings are made with great precision. These platforms depend on the existence of a technology and a production facility for various components or sending data to such a unit. The optimization of such a system of production, and greater demand for such projects (non-standard) can make this kind of architecture more accessible.

3 CASE STUDIES

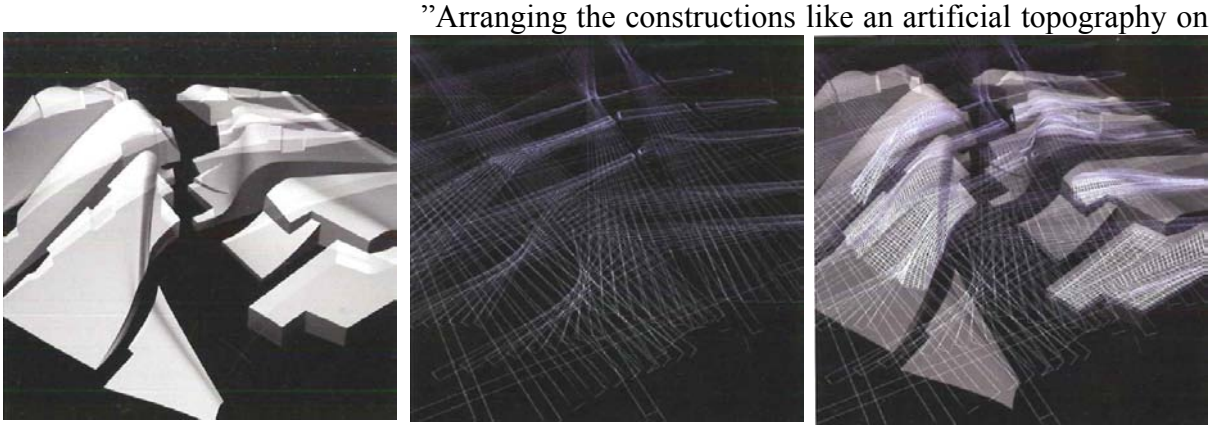
We can analyze the influence of computer design on topographic architecture through some examples. In contemporary architecture a few architects stand out, and their work was significantly influenced by CAD, revealing to them new directions that intersect with topographical architecture. It is worth noting that these projects are somehow experiments, because the impact of their presence, when completed, cannot be quantified from the design stage, nor can it be predicted the way the building is assimilated and how it stands the trial of time. These are some aspects that computerized design cannot anticipate, aspects related primarily to the ability of the architect to achieve long lasting architecture.

Despite similarities of some of the contemporary projects, in terms of the architects approach and the uniqueness of each site, we discover the singularity of each intervention. To illustrate some ideas, two large scale projects have been chosen. The projects differ both in terms of approach, and morphologically, and could not be achieved without computer design. The two examples are the *City of Culture of Galicia* and *Yokohama International Port Terminal*.

3.1 Peter Eisenman – The City of Culture of Galicia

The City of Culture of Galicia from Santiago de Compostela, is considered the largest topographical intervention so far. “Peter Eisenman understands topographic architecture as a way of going beyond the established relationship between shape and volume. This arhitect has turned the stone of the new buildings into forms that rise organically from the landscape.” [3]

The project depended on computer-assisted design since its concept phase. It virtually superimposes three layers in order to achieve a final result: the first layer is the city plan, the medieval centre of Santiago de Compostela overlapped with the topographic map of the hilly site; the second is a modern Cartesian grid, placed over the medieval routes, and the third is a digital distortion of the first two layers, depending on the topography of the site. The building relies on the concept of palimpsest. By superimposing the three layers a folded surface is resulting, which recalls the process of the mountains formation, by pleating the earth crust. ”Arranging the constructions like an artificial topography on



the hill platform, and excavating the hill to look carved out, he buries the complex without really doing so and builds at the top of the hill without seeming to occupy it." [4]

The City of Culture of Galicia, Spain, 1999–2013 - builging concept generated on computer
Image source: Drawings and Models by Eisenman Architects, from DAVIDSON, Cynthia ed., *CODEX. The City of Culture of Galicia*, The Monacelli Press, New York, 2005, p. 28

This project required a huge effort from all points of view, being started in 1999 and completed in 2013, but not entirely. Initially, it included six buildings, grouped in pairs as follows: Galicia Museum with The International Art Center, Music and Performing Arts Center with the Central Building and The Library with The Archives. The allocated budget has been double than originally estimated, and the building was not as successful as expected.

For this reason, and also because of the lack of funds, the International Art Center and the Music and Performing Arts Center were never built.

The City of Culture of Galicia, Spain, 1999–2013 - final image
Image source: http://www.flickr.com/photos/rh2ox/5693943711
License type CC BY-SA 2.0, see: http://creativecommons.org/licenses/by-sa/2.0/deed.en

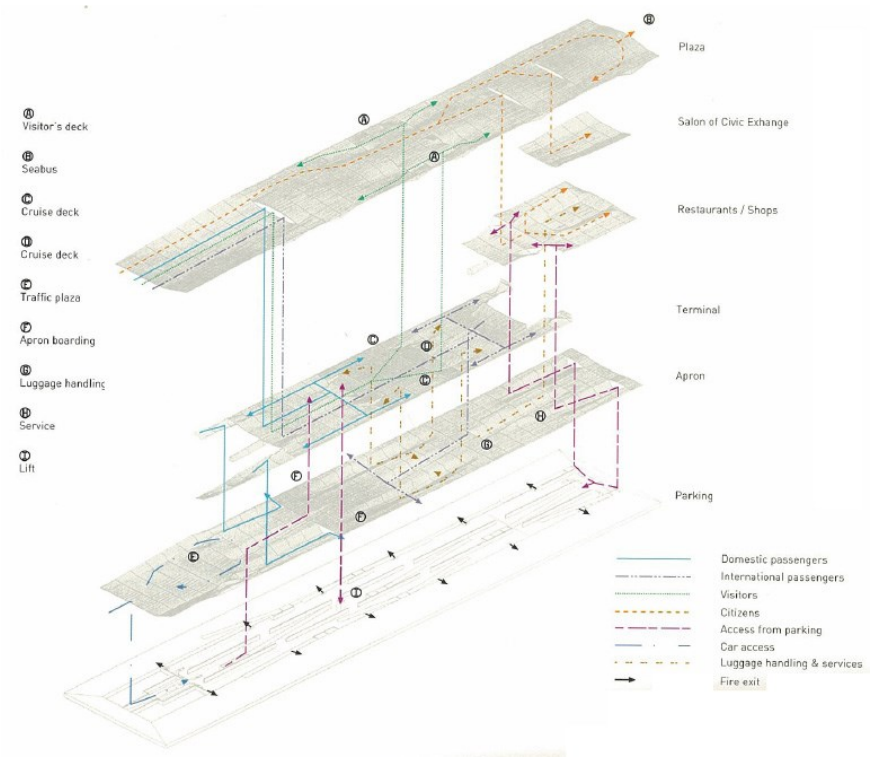
Although Eisenman is one of the most appreciated contemporary architects and *the City of Culture* was built, it seems that this project has not succeeded to be what everyone hoped at the beginning. Nor in the concept phase, neither in the design process was possibe to estimate the final result, since no costs could be estimated correctly. This is an example of a situation which was not well handled, and has undergone many transformations until completion, changes not in the benefit of the final product. Why did this happened? Maybe the team relied too much on the computer, or maybe the technique of the moment was not allowing yet the precise execution of such project.

3.2 FOA – Yokohama International Port Terminal

The second large-scale example is the *Yokohama International Port Terminal* designed by FOA, a project for which the computer was essential because topological surfaces were required. The architects wanted a different kind of space, and they managed to solve the architecture, structure and circulation system by using a single common element.

The project is a combination of several philosophical, cultural and formal tendencies and started from the possibility of generating the building organization based on the circulations system. FOA wanted a space different from those generated by the concrete frame structures, where the pillars are always present and the directionality is given by circulation. The terminal is a hybrid between a roof and the ground, an attempt to overcome similar experiments of the 70s, in which the circulation diagram was first organized, on which the

architecture was further developed. Here everything is more consistent, so circulations shape the fluid, uninterrupted and multidirectional spaces, totally different from those of a gate with a fixed oriented flux. According to the designers, the building concept was based on three important aspects. The first was to create a circulation diagram of interleaved loops, allowing a multitude of return paths. The second aspect emphasize that the terminal should not appear as a silhouette on the horizon, as a sign, but as a hybrid between a closure and topography, creating a building as flat as possible, which then turned into land, into a natural continuation of the ground. The third aspect was to turn the entire geometry of the building into structure, something that can withstand any structural requirements on its own. Normally, such a building requires pillars. Finally, FOA obtained a structural system, through large-scale surface deformation and folding, that became structure themselves. In this way a fluid building resulted, without stairs and pillars, ramps being associated with the main longitudinal structural lines. Articulating the circulation with the structural system leads to two distinct spatial qualities: an articulation between indoor and outdoor spaces and a continuity between the different levels of the structure.



Yokohama International Port Terminal, Japan, 1995–2002 – circulation scheme
Image source: SAKAMOTO, Tomoko, KUBO, Michael, eds., *The Yokohama Project*, Actar, Barcelona, 2002, p. 12

FOA started from the idea that the site is a public space and they proposed the roof of the new building to be an urban market, continuing Yamashita and Akaranega parks. The site and its orientation to the water front have had an important role, enhancing the public spaces of the city with the continuous structure that extends over the water. Instead of designing a building as an isolated object, a traditional structure, the terminal is designed as an extension of urban space, which gradually transforms, according to the circulations diagram, in a folded surface with various ramifications. These folds shelter different spaces, accommodating the various functions of the program. Thus the Yokohama port terminal in is an articulation of several functions: passenger terminal and urban functions, of which both residents and travelers can benefit.

Yokohama International Port Terminal, Japan, 1995–2002
Left image – aerial view
Image source:
http://en.wikipedia.org/wiki/Farshid_Moussavi#mediaviewer/File:Osanbashi_Passenger _ Terminal_-_Satoru_Mishima.jpg
License type CC BY 3.0, see: http://creativecommons.org/licenses/by/3.0/
Right image – topological surface
Image source: http://www.flickr.com/photos/joevare/5219549850
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For this project, using computer graphics was crucial in generating the form of the built object, but the architects were not relying on this fact. They do not deny the importance of form, but not the morphologic appearance interest them in the first place, but they emphasis more the process, the materials and the site. According to this idea, FOA claimed that:

”Architecture is not a plastic art, but the engineering of material life. This is what we hope distinguishes our work from Saarinen, Utzon or Gehry, but despite the formal similarities,… those comparisons are purely based on the formal output. Formal concerns are of significance, but this association does not tell the whole story. What we hope characterises our work is fundamentally the process of construction of the project, as our main priority ist o produce consistency in the process of construction and material organisation. In fact, we are interested in not having preconcived effects… In many respects we actually feel closer to Mies than to the architects that we are often compared to in virtue of formal similarities: it is his attitude of uncompromising commitment to the organisation of matter, his exploitation of contemporary construction technologies without formal prejudices, combined with his capacity to obtain buildings of piercing beauty that interest us, more than the analogy of the formal results.” [5]

Perhaps, besides good organization, cost calculation, fulfillment of the area requirements of the the real needs, this very fact has led to the success of the project: the shape is not everything in a project. Many of the buildings designed by FOA are conceived as a species for a particular ecosystem. Their goal is to build what emerges from the ground, coming as an antidote to traditional practices that generate stereotypes in architecture and to homogenous globalization.

This project would not have been possible without the advantages that computer design offers, both in terms of conception and design, as well as the organization. Computer graphics

not only have made it possibble to accomplish the project, but only 14 architects were required, not 30-40 as was originally estimated. By involving a small number of people, a better control of the entire design process as well as design costs was possible.

4 ADVANTAGES AND DISADVANTAGES OF COMPUTER DESIGN

Different systems of computer design, whether CAD or BIM, algorithmical or parametrical tools, present both advantages and disadvantages. The major advantage of computer design is that it facilitates imagining architecture, creating a visual placeholder, which allowed the development of projects that until recently were seen as utopias. Thus computerized design opens up to new architectural experiments.

A first disadvantage resulting from here is the fact that from experiment one can easily slip into extremes, putting too much emphasis on form, on aspect or on exploring the virtual space. Although it seems that the computer covers most of the problems, in real situations one cannot achieve a complete control over the end result, in terms of economy, impact on users and the way the built object withstands time, because aesthetic requirements change over time and thus the intervention is not always successful.

When applied to topographical architecture, the technique is especially useful since the results are concrete and the final product is not virtual or formal, but when it's shape and costs are justified by other considerations, such as low impact on the environment. Topographical architecture is percived as an alternate nature and the relationship between building and landscape acquires new standards and values. The landscape is a basic component, a "building material" for architecture, not its backround. Broadly speaking, topographical architecture respects and puts forward the environment in which is integrated. In terms of ecology and sustainability, topographical architecture is one of the most eficient forms of architecture, that restores and gives nature a just position in our everyday life.

It is known that the transposition of the project to built object is always likely to cause problems. With all the digital design advantages, many of the ideas or projects do not exceed a certain stage, due to the impossibility of achieving them technically, even now, when technology is highly advanced. But for topographic architecture even the design process is problematic, because many times one must shed former design strategies and thought patterns and start anew, with a different approach. In this case it is impossible to work according to traditional architecture rules, but by following the rules imposed by each site separately. Working with the earth implies a re-articulation of the materiality, depending on the type of intervention exercised on the ground surface. Computer design allows working with the land as a malleable material, and in the same time facilitates a permanent comunication with the context.

Currently, topographical architecture is a type of architecture more difficult to accept, more expensive due to the impossibility of standardization, more difficult to build and therefore is often avoided. Although computerized design facilitates visualizing and achieving complicated objects, and can even contribute directly in the production process, in many areas, as is the case of Romania, the approach is minimal because the forms are difficult to control and handle even by many architects. Also, the actual execution of building components is reduced due to the low number of units that could produce them. Importing components is an alternative, but it always increases the costs of construction.

Another aspect that apparently seems to be an advantage is that computerized design has reduced the working staff for a project, which allows a better organization, and the risk of errors is reduced. Even when it is a complex project that we are taking into account, that may

involve working with multiple programs, minimal reduction of the team to achieve maximum efficiency is prefered. This has lead to the disappearance or reduction of the working collectives, which required in a short time to modifications of the working system and the number of jobs needed is rapidly decreasing.

5 CONCLUSIONS

Topographical architecture has no predetermined rules, as seen in the case of the traditional architecture, and can be as unpredictable as nature, or rather as the context in which integrates, whether natural or urban. Although topographical architecture chooses to escape rules, conventions and standardization, its forms depend on the unique features of each site separately.

Topographical architecture combines technology with the environment at all levels. This has depended on the development of computerized design techniques to a certain extent, introducing new directions like parametric architecture or topological approach that allowed achieving organic configurations, thus facilitating the insertion of the built object into nature by adapting it to the ground. Computer design allowed refinement and the creation of complex configurations, a better manner of controlling and handling forms, especially when it comes to transitioning from building scale to large-scale territory design and to a better contextualization of the built objects.

Involving landscape as base material element of the project, large-scale topographical architecture is not possible without the aid of a computer. Computerized design facilitates achieving topographical architecture that allows us to be global, while keeping local particularities. This type of architecture is often seen as a solution, a new approach in the issue of territorial continuity in the current context when space is scarce and multiple disciplines involved in the design process require overlapping for a better understanding of landscape as a continuous surface and as a space in all its complexity. Today the design process focuses on interdisciplinarity and looks for solutions and inspiration sources in various fields to solve problems related to architecture and urbanism.

Some solutions that depend to some extent on the computer design, can support the evolution of topographical architecture. The solutions would be: harmonize architecture with the environment through the development of intelligent technical systems, viable from both ecological and economical points of view, and an attempt to standardize the production techniques and not the buildings and their components.

Over the last 30 years, with thoroughgoing study of topology, fractal geometry and other mathematical elements generated through computer graphics, both idea of space and the perception of space in which we live in have changed. We live in a world which is increasingly dependent on instant comunication, digital manipulation, mass production of virtual spaces and abstration and we lose the sense of reality. Today, manifestos and architectural experiments proliferate in the virtual space created by design and 3D modeling programs. Computer design contribution to topographical architecture highlights concrete results, because more than any other type of arhcitecture, topographical arhitecture gives back the land and helps retrieving the sense of reality of place.

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ACROSS THE (de)SIGN

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Abstract

Drawing is the main instrument of research and communication in Architecture, starting from the first image to the built result. The didactic purpose of Architecture – as well as the work activity - is largely supported by drawing: students' academic careers and professional development – stand for as the future of our cities – heavily depend on their architectural drawing skills.

The primary issue of drawing concerns the general comprehension of the instrument, its versatility and its correspondence to the project phases.

Photography is probably the break point of traditional project analysis, producing a visual synthesis of the logical steps of the project: the image comes to overlap the construction and vice versa. Renderings, allowed by modern technologies, represent nothing more than an upgrade of this photographic feature, picturing the synthetic view of the building from the beginning of the design process.

According to Louis Khan quote, "Architecture is the thoughtful making of space" could its representation – the drawing – tell a different story endangering the core of Architecture itself? Does this issue concern drawing and its traditional-vs-modern instruments or rather does it concern its use "outside" the discipline of Architecture?

Keywords: Architecture, design, drawing, image, photography, renderings, sketch.

A line (or something) in the Universe is real because it is finished; it is finished because it is not perfect; it is beautiful because it gives the idea of perfection without being perfect. A line is beautiful because it is finished. [1]
Tancredi Parmeggiani (1964)

1. Methodological Premise

Drawing is the main instrument of research and communication in Architecture, starting from the first image to the built result. The didactic purpose of Architecture – as well as the work activity - is largely supported by drawing: students' academic careers and professional development – stand for as the future of our cities – heavily depend on their architectural drawing skills.

Therefore we can talk about drawings in Architecture as projects and we can discuss about the design process involving these drawings.
The primary issue of drawing concerns the general comprehension of the instrument, its versatility and its correspondence to the project phases. During the phase of discovering and setting of the first image, namely the phase of initial reaction and answer to the requirements of Architecture, the drawing hand will be the leader of the project research: quick sketches are essentials for what Peter Zumthor calls “promise” of transforming a geometrical space into a Place [2]. During the phase of design a much more rigorous drawing will be used, less synthetic and more analytic as the project develops: what was previously called “drawing by ruler.” The executive phase, towards the construction, will demand to apply the technical information to the drawing in order to build a proper construction, “a regola d'arte”: drawing will be detailed and essential in this phase. The aforementioned drawing process has remained the same, without any relevant variation, from 1794 and Gaspard Monge's lectures about the orthogonal projections (Geometrie Descriptive, Paris 1799); before that, the main instrument to foresee any construction problem and preview the architectural image was the model.

Photography is probably the break point of traditional project analysis, producing a visual synthesis of the logical steps of the project: the image comes to overlap the construction and vice versa. Any further analysis to explain the disciplinary stages of Architecture seems to be unnecessary and, apparently, in plain sight. Virtual reconstructions, allowed by modern technologies, represent nothing more than an upgrade of this photographic feature, picturing the synthetic view of the building from the beginning of the design process. The traditional analytic drawing of the building looses its importance and the project research comes to be synthesized in a virtual image without any knowledge of the construction details: the façade does not have to answer to structural or functional logic, it lives of its own life; plans and sections seem not to be needed anymore.
This process becomes evident from the architectural productions of the Seventies, where conceptual projects replace the interest for the construction. The extensive urban projects such as *Roma Interrotta*, the architectural abstractions by Franco Purini or the intellectual designs by Peter Eisemann, both representing clear examples of this “draft Architecture”.

According to Louis Khan quote, “Architecture is the thoughtful making of space” [3] could its representation – the drawing – tell a different story endangering the core of Architecture itself? Does this issue concern drawing and its traditional-vs-modern instruments or rather does it concern its use “outside” the discipline of Architecture?

2. Etymology of the design

The theme "Traditional vs. Computational" involves a strong sense of contrast: a world tries to replace another, and the latter defends itself, reacts.

Image divorces from any rules and proclaims its own reality (XX-th century). We are now facing a revolution of the enchained spirit searching liberation from the straight canons of technology and efficiency after having lost the contact with the transcendental understanding of the world. But technology has already become too powerful and art itself started to depend on it. The present paradigm of parametric architecture and of computer assisted design in general is an effect of this growing role of technology in architectural representation. Should we assume this role unconditionally or should we preserve classical patterns of representation? That is the question. [4]

This paper addresses three fundamental concepts: the linguistic connections - in my opinion first of all etymological - between sketches and project (sketch/design), the value of the "sign"

as graphic transmission of the project data (sketch/drawing) and the project itself as analogical/symbolic research to confirm the images (sketch/design).

In other words, and in particular with the educational process of learning “craft” architecture which necessarily passes through drawings, I do not want to highlight the contrast between traditional hand drawing vs computerized drawing but I want to investigate, as more meaningful, the modifications introduced by the digital world in design and drawing in the fields of Architecture and the didactics of the discipline, some more evident than others though all fundamental.

Initially, with regard to languages, I believe is worth briefly recalling the etymological definition of the term *project* from the Latin world *projectus/pro-jàcere* meaning to set, to throw before: it has the value of "prefiguring something" and has the same Latin root of the verb “to conjecture” (*cum-jàcere*) [5]
The etymology of the Italian word *disegnare* (to draw) comes instead from the Latin *designare*, “to note by means of signs”, consisting of *de* (from the Greek διά/through) and *signum* - sign means picture, effigy, sign, but also “to delimit”, “to place” (Aramaic siknum). [6]

“To represent,” often synonymous of “to draw” both in Italian and in English, comes from the Latin verb *re-ad-praesentare*, composed of the prefix *re*/again and *praesentare*/to introduce or to make present again past or distant things. [7]

The etymology of keywords will be used several times in this paper in order to explain the the original meaning of the words and to understand their symbolic value. Therefore, for instance, as regards digital drawing, the term "digital" describes the action of fingers tracing lines by pressing the keys of a keyboard and does not reflect, as implied by the Italian verb *disegnare*/to draw, the symbolic value of the action of sketching lines in order to define and limit a portion of space (design/project).

3. Space, sketch and technique of representation

The traditional illusory contrast between the terms *tradition and computer* in relation to drawing, actually merely represents a series of data that are transferred from a manual system to another more technologically advanced: the focus seems to be mostly on the enlargement of existing capacities - execution speed, memory expansion, ease of acquisition/data transfer. A sort of "muscular increasing" of possibilities rather than a "conceptual" increasing in order to investigate the expressive possibilities of the space: the architectural design process is a research project of space and not just an expression of language used as pure communication activity.

But are parametric design or *computer assisted design* really challenging and changing the architectural knowledge produced in our universities? The answer should be yes if we are looking to the formal appearance of architecture, to its superficial skin: the new languages developed by modern construction technologies produce "abstract" figurations and complex geometries, sometimes so complex that only a computer can investigate and solve mathematically the form; in terms of architectural space it seems no real innovation has been produced: for example, we still live in houses that - for better or worse - are designed with modern materials and technologies but often internally distributed with the same past conceptions of use/life.

Even in purely constructive terms we are far from the cultural/technical revolution

designed/conceived by the new houses of the early twentieth century avant-garde or the innovation represented by the use of reinforced concrete by Auguste Perret and the changes which its use determined in the architectural space.

To clarify: in structural terms the "disorder" of modern structuresdoes not alter the fundamental relationship of support, $\sigma = N / A$ (where σ is the resistance of the soil, N is the load and A is the area of the structure); it only alters the figural complexity, multiplying structural elements.

The relationship between design, project and construction, in the transition from traditional or manual drawing? to computerized sketches and drawings, remains unchanged as well: starting from an initial image (sketch / rendering), an analytical phase of the components of the building (project design) follows and leads to the construction phase. On the contrary, the fundamental relationship between that initial image and the design process dramatically changes: to observe the changes we have to briefly describe what architectural drawing has to be.

4. Definitions about design

It is clear that the first function of design should be - and has been - to "complete" the spoken language as well as its written form: they are both, originally, "codes" referring to the materiality of objects (project) and, later, they also transfer analogical or symbolic meanings through a process of interpretive reading (analysis).
As architects, thus interested in the project and the form of space, and as teachers explaining architecture through drawing techniques, it seems interesting to compare in rapid sketches a medieval palimpsest, the drawings of the Campo Marzio made by Piranesi, the artistic expressive power of a paint of Capogrossi .

The way to analyse and to compare these images does not change: abstraction and observation allow us to assimilate them as layered, to read between them a figurative and figural continuity.

The core interest lies in the principle of figurative analogy that we are able to apply to viewed images: willingly or not we try to link together events widely separated in time and intentions.

Peter Zumthor said:
If the naturalism and graphic virtuosity of architectural portrayals are too great, if they lack "open patches" where our imagination and curiosity about the reality of the drawing can penetrate the image, the portrayal itself becomes the object of our desire […] *The portrayal no longer holds a promise. It refers only to itself.* [8].
It is the room left to the interpretation of the signs that form a figure, a design, an architecture; what Peter Zumthor calls "... our imagination and curiosity about the reality of the drawing ..." appears as a subjective reading of a series of figurative data which are expressed by codes constituted by lines, points, curves: they suggest and do not claim - at least initially - completed or final forms.

Le Corbusier wrote:
How could we enrich our creative potential? […] *I would like architects – not just students - to pick up a pencil and draw a plant, a leaf, the spirit of a tree, the harmony of a sea shell, formations of clouds, the complex play of waves spreading out on a beach* […]″ [9]
And Mies van der Rohe underlined:
″ […] *Beside to the scientific training, architecture students must first earn to draw, in order to dominate the technique of the means of expression and train the eye and the hand. Through exercises, students must be conveyed the sense of proportion, structure, shape and material, their connections and their expressive possibilities* […]″ [10]

Following those quotes, I think the most immediate technique *...to train the eye, to convey the sense of proportion and to enrich their creative potential...* still remains the sketch, the first hand drawing representing the values and meanings of the architecture that will be accurately investigated and developed along the project process and made permanent in the construction of space.

5. Hand and sketch

The hand is the first tool that allows us to give form and body to an image, directly connected to the brain: our thought is reflected in the hand sketch. The pencil traces the signs that the hand dictates. The graphite, depending on the hardness and the pressure exerted, leaves traces finer or coarser, evanescent or marked as in engravings: the idea of architecture, through the muscles of the hand, is in direct contact with its conceptual representation.

In this way the consistency of the instruments becomes indispensable for the clarity of what we want to represent, for the accuracy of the reading and for the properties of language: who draws knows that the pencil, in order to be manageable, must exceed the length of a finger but not its diameter; a soft graphite slides on a paper that is too smooth and an harder one will not have the necessary continuity and accuracy on a rough surface.

The dimension of a sketch will also have a precise measure dictated by the possibility of rotation of the wrist: a bigger sketch involves a movement of the elbow, namely raising up the arm eliminating an essential foothold for a good execution of the lines.

Hence, here the first conflict between a tool "extremely pliant", the hand, and another "extremely efficient", the computer, arises: it seems to be missing a tool able to transfer the sensitivity of the hand into the effectiveness of the computer; there is a graphic tablet which grossly reproduces the characteristics of thickness of the sign tied to the pressure of the hand, but it is rarely used, perhaps for its high cost, and therefore it is not developing in terms of research and quality improvement (for example the different grains of papers).

In hand drawings there will be, from necessity of the drawer, only a certain amount of selected data, voluntarily or involuntarily chosen through a hierarchy of readings and evaluative elements. The photograph, the one that we are generally able to shoot standing in front of a building, prevents this selective process: it is synthetic by nature, it contains all the information offered by the object and its own interpretive reading is difficult.

While observing a photograph, we need sufficient knowledge to extract the different layers of information? that make up the entire picture and then we need to assign a hierarchical value to those: only then the image, interpreted and reduced to its simple elements, can be used to explain / to understand an architecture; that means that one sketch must represent one layer. Rendering reproduces the synthetic nature of photography and reduces the possible interpretations of the Place.

6. The meaning of the drawing

Signs, like words, have their conventional meaning even before they find expression in an architectural form, and their casual use, as well as a non-rational sentence, produces confusion and drives us away from the clarity of the idea.

Certainly, if drawing is a language, it should be used to describe/to foreshadow objects (project), to clarify and to communicate the data (executive drawing and construction's phase); to fill a wall or to intensify the lines that surround it and conventionally transmit the

idea that that wall is represented in its section.
In this case the computer, offering almost endless possibilities of information, complicates the transmission of one single *datum*: what once was the "black" section has become "any colour" that can be figuratively pushed into the production of a photographic image. There will no longer be the allusive convention of a section but a wall cut and viewed from above. So the "basic" communication becomes complex: in addition to the section we have to observe the shape and the position of the bricks, the mortar, the colours of the materials: the analysis phase of the project is anticipated and exceeded only by the iconic power of the "real" image.

However, it should be added that the mere transmission of data does not seem sufficient to justify the creation and the use of language: it is clear that there is, within the data, a communication system of symbols which allow the transmission of another level of thinking, other data - we might say - qualitative rather than quantitative.

7. Communication of data

" [...] *Under this point of view it is a language necessary to the man of genius when he conceives a project, and to those who are to have the direction of it; and lastly, to the artists who are themselves to execute the different parts."* [11]
(Gaspard Monge)

To clarify what the first sketches represent, after the Precis des leçons d'Architecture of Gaspard Monge, it is normally used the so-called two-dimensional drawing: plant, elevation and section of an object produced by cutting the Cartesian space along the three mutually perpendicular planes. Drawing with rulers represents the time of checking and controlling the initial image, analysing and selecting every rational element of architecture; it means to translate the idea of form (sketch) into useful data for the construction, through the logic of the measure and the functional or structural programme.

Gradually, the two-dimensional drawing has codified a system of signs and ways to represent what will be a building or a new space: since 1932, Architectural Graphic Standards has been referred to as the "architect's bible." From site excavation to structures to roofs, this book is the first place architects look when confronted with a question about building design. With more than 8,000 architectural illustrations, including both reference drawings and constructable architectural details, this book has provided an easily accessible graphic reference for professionals.

This book has been a sort of common heritage of drawings, internationally recognized, perfectly understandable, verifiable and communicable, though within the freedom of personal choice.

It seems interesting to note that, in some cases, standardization has brought not only benefits but also communicative stereotypes of interpretation that reduce the chances of reasoning on the space to be designed. For example, the design of a wheelchair to indicate environments with mandatory accessibility: *accessibility* today is directly related to the movement of a wheelchair excluding from the research for architectural solutions those who are visually impaired, blind and deaf (besides children and the elderly, not pathological, but still limited as regards some movements).

8. Analogy / symbol

● analogy s.f. from lat. analogy, gr. ἀναλογία, "relation of similarity, equality of relationships, mathematical proportion"
● symbol / 'symbol / s. m. [from lat. symbŏlus and Symbolum, "juxtaposition" as derivation

of συνβάλλω "put together, to coincide" (composed ξύν "together" and βάλλω "throw") (Treccani Dictionary of Italian Language)

As already mentioned above, data transmission is clearly not sufficient in the communication system; on the contrary, at the beginning signs had a magical and symbolic meaning, which increased the value of objects of common use.

In the essay “Perspective as symbolic form”, Erwin Panofsky shows how each cultural age/time has developed its own way of representing spaces, which can be understood as the 'symbolic form' of that culture. Starting from Albrecht Dűrer's definition of "*perspectiva* (meaning) *see through*", the whole picture becomes a window through which we can see. This space is constructed by taking into account an immediate perception or a more or less correct geometric construction: a mathematical structure is antithetical to the perception of space that the two eyes in constant motion, on whose concave and not flat retinas images are projected. Thus, the flat perspective construction is related to feeling the space, and to representing it in a particular way, among the many possible.

Therefore our continuous referring to it is a necessity of communication for graphic analogies. (La prospettiva come forma simbolica di Erwin Panowsky, Feltrinelli, Milano 1998)

A quick example of communication of analogies in architecture. From the research about the needs of military fortification of the Renaissance cities, the image of the city in the form of a star whose Palmanova becomes the icon was born.

In Rome the trident became an urban sign recognized and reproduced. The similarities with other mathematical fractals and biomorphisms are evident in buildings by Calatrava or Antonio Gaudi: in *Re-understanding Computation in architecture via its Biological references Mr Lawal Yusuf (L.Y. Digital Design in architecture ARC 5502 – 2014) s*aid *“* [...] *computation is a tool for human ideas to be developed. It is effective in the field of architecture for its service as generative medium for design and in biology for its regenerative feature, which is effective in instances like gene duplication. Lastly in morphological sense the use of computational tools in of combination of the two fields to generate or design new forms (biomorphism) is vital in the field of architecture for its form generation capabilities”*. [12]

9. The virtual image

It is necessary that design, in its pedagogical value and in its use as architectural practice, is not only the description of an object but as E.N. Rogers said, "… it goes back to its original semantic value that today is summed up in the English word design ...": its etymology assumes, simultaneously, two Latin meanings, to track signs and to design buildings. [13]

According to the Call for Paper, *"Images divorces from any rule and proclaims its own reality (XXth century)"*. This might be true for painting, either abstract or informal, but it appears a little less convincing as regards architecture and design/drawing, which necessarily have to address the construction informations/rules in order to be able to transfer any imaginary drawing into a real-life space. In this sense the sketch, the first image - virtual because allusive, analogue - if it really belongs to the architectural domain, must contain in itself the possibility to be translated into practical data, afterwards constructed and photographed as the conclusive image of the project.

This translation process, necessary to identify the components of any architectural space, is the teaching area where is possible to intervene in: in other words, I think that the possibilities of interaction with a student are developed starting from that initial image: that the one which

is intuitive and that we should leave it for students to research and discover through their sketches. Using project methodology and drawings we can intervene along the design process to give order, rationalise the image, control the proportions, structures and materials which lead sketches towards an accomplished architecture.

10. A conclusion: deductive process vs inductive process

In architecture design, what changes compared to traditional hand drawing is the development of the design process, starting from the definition of the first image to the photography of buildings.

At the beginning, during the traditional project process, there was the sketch of the first image, what we called earlier the "virtual image".

Then the more precise drawing by rulers intervened to gradually analyse all the structural elements of a building dividing and classifying it by two-dimensional components: plans, sections and elevations at different scales, towards the construction detail.

At the end of the project, a perspective which reconstructed the third dimension of the building was drawn to illustrate its "finished" form: even though detailed and coloured, the perspective still left room for interpretation before the construction of the building. After the construction, photography was useful: it synthetically represented what had been designed (expected) and it verified whether the intentions and the outcome of the designed space in relation with the surrounding architectural context actually corresponded. To follow this process it was necessary - and it still is – knowing the meanings of the architectural space and the object to be photographed: visuals, axes, relations between structures and landscape, lights. The aforementioned items have to be taken into account in order to portray in a photograph in the best way possible the completeness and the complexity of the Place and architecture.

This process could be described as "deductive".
This is no longer: the rendering - that is a virtual "snapshot" of the future building - has become the main tool to investigate and describe an architecture, as synthetic and detailed as a real photographic image.
The design process is reversed, it necessarily becomes inductive. All subsequent phases will seek to confirm the fixed and prefigured image that is no more allusive but has become assertive: that image replaces other possible images – in the same way as the permanent images of a movie often replace the suggestions of a book. The details that a rendering is able to represent will become constraints, required lines to research space and figures, abstract synthesis from which to extract the components of the project: the changes/developments of the project will stem from technologies or requested performances of the building rather than from the discovery of new areas of architectural research.

The risk - or the daily practice - in teaching is that students take a pictured window by Steven Holl, a photographic wall by Peter Zumthor and a rendered coverage by Zaha Hadid and they collect these images together in a architectural foreshadowing without any sense in terms of research of architectural spaces.
Only pure language.

I would like to conclude quoting Louis Khan:
The arise of architecture reflects the moment when the walls divided and columns appeared [...] *A column, when it is used should be still regarded as a great event in the making of space.*

Too often it appears as but a post or prop. What a column is in steel or concrete is not yet felt as a part of us. It must be different than stone [...] *Concrete or steel must become greater than the engineer* [...] *The continuous renewal of architecture stems from the transforming conceptions of space* [...] *Forms and spaces, nowadays, have not found yet their place in the order.* [...] *In the past solid stones were used to build* [...] *now we have to build with hollow stones*. [14]

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INTEGRATION OF THE TOURISM DIMENSION IN SIBIU HISTORICAL TOWN

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Abstract

Tourism and cultural heritage are the basis of two major, self-standing fields, both very complex and strongly developed, which are, in the same time, under continuous changes due to the evolution of their main concepts. Often functioning in parallel, these two fields may nevertheless interfere on certain levels – for example through common elements such as architectural heritage which is being used as tourism attraction as well.

The present paper is motivated by the contradictory aspects that appear in the relationship between cultural tourism development and preservation of heritage values. While the relationship between tourism and heritage can be mutually beneficial, there are also negative aspects that go beyond physical alteration of the heritage, for example: an excessive consumption of the heritage, disneyfication, gentrification, restoration according to the expected touristic image, lack of authenticity, tourism needs that sometimes become more important than the ones of the residents. Recent tourism developments in Romania led to valuable operations, but also had destructive impacts on architectural and urban heritage. Having also as an argument the present situation from Romania, where restoration and capitalizing of cultural heritage are mainly subordinated to tourism development (within the Regional Operational Project - P.O.R.), the paper will bring a contribution to the problems of the dialogue between tourism and heritage, by proposing concrete directions of action for the tourism development in historic centres in terms of sustainability.

The paper will focus on the assessment of the capacity of historic centres to absorb tourism developments in such a way that the intrinsic values of cultural heritage assets are not affected. A working methodology considering seven main criteria will be presented, outlining the architectural and urban interventions that are necessary for the integration of tourism infrastructure in historic centres. The criteria proposed for this type of analysis are: *state of conservation of the historic centre, connection of the historic centre with the rest of the town, elements in the proximity of the historic centre (in some cases, the buffer zone), urban traffic in the historic centre, integration of the tourism functions, urban historic image and elements of urban planning and architectural detail*. Analysing tourism interventions in relation with the proposed criteria, should facilitate the integration of tourism developments without affecting the heritage values. These proposals will constitute a solid basis for future lines of action, by their integration in realistic projects of development and for outlining concrete working steps.

As a case study there will be presented the already well-known historic centre of Sibiu, its mediaeval core being subject of tourism developments especially since the European Cultural Capital event in 2007. Growing around the three main squares, the mediaeval town achieved a good tourism reputation by developing an infrastructure well balanced within the present urban territory. By analyzing the tourism development through the mentioned criteria, it could be proposed an architectural and urban planning integration of the tourism dimension, in terms

of a sustainable development too. Within this concern, several urban connections between the main tourism assets may be developed from an interdisciplinary point of view. For example, from urban traffic point of view, pedestrian areas may attract locals and visitors as well, being able to absorb more tourism infrastructure, such as restaurants, caffes and even traditional commercial spaces. On the contrary, a street with an intensive traffic is going to be less frequented by visitors, thus not being able to absorb too many of the tourism infrastructures as the ones named before. In the same time, relating Sibiu's tourism development to its surroundings, it could be proposed a system of historic settlements from tourism point of view, based on architectural heritage, as well as traditions and local lifestyle.

As a conclusion, based on a very detailed analysis, architectural and urban planing recommendations may be done for a balanced and sustainable development of the tourism infrastructure within the mediaeval historic center of Sibiu. Such an approach is worth to be integrated in urban planning, as well as in tourism development strategies – in this way, the contradictory aspects that may arise from an independent functioning of the two fields (tourism and cultural heritage) could be managed in order to protect the values of the historical centre.

Keywords: historic centres, cultural heritage, cultural tourism, tourism impact, Romania.

1 INTRODUCTION

Tourism and cultural heritage are the basis of two major, self-standing fields, both complex and strongly developed, which are, in the same time, subject of continuous change due to the evolution of the concepts that govern them. Rather often these two fields act in parallel, each one following its own way, although they may interfere at certain levels through common elements such as heritage values which, at some moment, become tourism attractions. In this way appear areas of confluence where the tourism is based on, and discovers the heritage values, and the heritage becomes capitalized by tourism development and visitation.

Contradictory aspects appear in the reationship between cultural tourism development (more precisely, the development of specific tourism infrastructure) and the way that cultural heritage objectives are capitalized (more precisely their specific features that need to be preserved). Thus, it is important to identify and outline the architectural and urban planning interventions made with tourism purposes, which do not affect the heritage values.

In this context, it appears both opportune and necessary to propose a theoretical approach which allows to outline the architectural and urban planning interventions within the tourism development of urban historic centres in terms of sustainability. More exactly, this methodology is meant to analyze the existing values and situation versus tourism development, such as to integrate the architectural and urban planning interventions that are both necessary and possible, in order to develop a tourism infrastructure in urban historic centres. With this in view, one accentuates on the assessment of the historic centre's capacity to absorb tourism development, by combining analysis criteria from the fields of both tourism and cultural heritage.

Finally, the main objective of this analytical approach is the proposal of architectural and urban planning directions of action within the tourism development of urban historic centres, with applicability to case studies from the whole Romanian territory. As mentioned above, the present work brings contributions to the problem of dialogue between tourism and cultural heritage, especially focussing on architectural and urban planning aspects in historic centres, aiming to obtain a more balanced relationship between tourism development and cultural heritage value.

2 INTERVENTION METHODOLOGY

The relevant literature has mostly been oriented until now on the analysis and criticism of particular case studies, especially negative examples of intervention, and less on the selection and proposal of a way to handle the main problems that appear with the tourism capitalization of towns with historic centres.
Thus, it appears as opportune to give special attention to the historic towns capacity to absorb tourism development, as long as this concept assumes self-regulation, amortization and adaptation to the new conditions up to a level of maximum permission, which, once exceeded, one reaches a saturation such that nothing additional can be received without modifying the valuable specific features.
As concerns the approach of action directions considering the assessment of this absorption capacity of tourism development, a new method has been proposed to evaluate this maximum level admitted for a tourism development at a cultural heritage destination, with a direct application in the present case for urban historic centres. As a synthesis of the consulted bibliography, the literature review reveals several aspects regarding the relationship between heritage rehabilitation and cultural tourism development, leading to a proposal of criteria that have common aspects for both fields.
These criteria comprise together problems from the cultural heritage field, aspects that influence tourism development at a cultural heritage destination, as well as aspects with impact on the monuments specific cultural value. Namely, the criteria proposed for the analysis are the following: *state of conservation of the historic centre, connection of the historic centre with the rest of the town, elements in the proximity of the historic centre (in some cases, the buffer zone), urban traffic in the historic centre, integration of the tourism functions, urban historic image and elements of urban planning and architectural detail.* The proposed criteria form an open list, and as such new relevant elements can be added, depending on the case, such as to refine the model (the intention is to test the model not only for urban historic centres, but also for isolated historic monuments, rural historic centres, etc, all these situations highlighting new aspects related to the criteria already presented for analysis).
For each of the criteria mentioned above: one proposes a definition (specifying the meaning of that criterion in relation with tourism development in urban historic centres), arguing also the choice of criterion; one defines the main indicators considered for evaluation of the criterion as a function of conditions needed to achieve a balanced state; one points out the inter-dependence relationships between the proposed criteria; finally, one indicates elements guiding the absorbtion capacity assessment of tourism development infrastructure at the named destination.
Having in mind that analysing tourism development in historic towns is particularly complex due to the dynamism of the urban organism, a special emphasis is set on for the urban planning dimension in applying the methodology to a particular case study, in connection with the existing reationship between objectives and/or heritage ensembles, and their relationship with the rest of the town. Thus, for example, the criterion which refers to the *connection of the historic centre with the rest of the town* achieves a special importance within the proposed methodology, both due to its urbanistic dimension and to the particular tourism-heritage relationship that appears at urban development level. Thus, detailing on this criterion means oulininging the following elements:

- *definition*: the possibility to extend tourism infrastructure outside the historic area with tourism objectives;

- *indicators used in evaluation:* secondary tourism nuclei within the town, centres of development within the town, ways of connection with the rest of the town (with motorized or pedestrian traffic);

- *criteria with which it is related:* the criterion relative to the state of conservation of the historic centre, the one relative to the urban traffic, and the one relative to the integration of the tourism functions

- *guiding elements for the absorbtion capacity assessment of tourism development:* a direct, easy connexion between the historic centre and the rest of the town favors tourism infrastructure extension along the connection routes (*high absorption capacity*); an indirect, difficult connexion between the historic centre and the rest of the town, or isolated sub-nuclei with tourism potential, do not favor a compact and continuous tourism infrastructure extension (*reduced absorption capacity*).

The study and the detailing of the analysed criterion also has as purpose to settle action steps in the absorption capacity assessment of tourism development outside the historic centre (and in relation to it) as well, on this basis being possible to make appropriate proposals concerning the allowed and/or recommended architectural and urban planning interventions. As an example of this aspect, it was chosen a highly relevant case study – the town of Sibiu, having both its valuable historic centre and other sub-nuclei with heritage significance and tourism interest. The analysis of Sibiu as a centre of tourism development will be presented in parallel with another south-eastern European town - Pécs from Hungary, having both architectural, urban planning features and historical evolution similar to those of Sibiu, this case offering examples of good practice that could be taken over and adapted in Romania in the tourism development process.

In the following, the presentation will concentrate on examples of some aspects regarding tourism development in Sibiu, with focus on the study of the appearance and development of a tourism infrastructure along the axes that connect the historic centre and the rest of the town. Based on similarities between the analyses of the two cities, only some of the more relevant aspects will be highlighted, serving also to proof the applicability of the absorption capacity assessment model for tourism development.

3 CASE STUDY: THE HISTORIC TOWN OF SIBIU

In order to analyze the absorption capacity of tourism development in Sibiu town, a partition of its historic centre into severeal sub-areas has been performed. This sequential analysis is necessary especially due to the large area occupied by the historic centre (approx. 80 hectars), and to the different urban evolutions of the *Upper Town* (*Oraşul de Sus*) and the *Lower Town* (*Oraşul de Jos*) (and even between sub-areas of these), but also due to the fact that it is normal to make a difference between the interventions with tourism purpose in order to be able to highlight the elements of maximum authenticity of these areas instead of using standard formulas of tourism arrangement.

Because one wishes to study the maximum allowed (or accepted) impact that tourism development can have upon the historic centre specific values, in setting up this areal partition, indicators that belong to the tourism attraction and the corresponding infrastructure will have a larger weight (e.g., tourism importance – affiliation to cultural tourism itineraries, accessibility – connection with the rest of the town, urban traffic), also taking into account indicators that provide the cultural value (e.g., urban image, urbanistic-architectural value, historic value, functional division into areas, or zones) in both *Upper Town*[1] and *Lower Town*.[2]

In the following, there is going to be detailed the criterion regarding the *connection of the historic centre with the rest of the town,* with italics being marked the paragraphs related to regulations (recommendations, but also restrictions or allowances) proposed for future architectural and urban planing interventions concerning tourism dimension development (and especially its integration) within the existing historic framework of the analysed historic centre**:**

- the main connection routes leaving from the historic centre towards the rest of the town originate in the central nucleus of the three squares, and developed on the basis of the old structure of transit routes in the area (e.g. the pedestrian route Bălcescu – the road to the Olt valley, Gh. Magheru street – the road to Braşov, Ocnei street – the road to Ocna Sibiului, Turnului street – the road to Alba Iulia); the only connecting route that does not start from the main squares area is the one between the historic centre and the railway station (the axis Faurului – 9 Mai str. which runs approximately parallel to the direction of separation between the Lower Town and the Upper Town);
- the area of the main squares is easily accessible (especially pedestrian access, except for the areas with urban staircases) from any point of the historic centre or peripherical to it, within its protection (or buffer) zone, and there is a rather easy and direct connection with the rest of the town, through main routes which cut through the historic centre and meet in the main squares area; **qualifier: easy connection with the rest of the town**; *the main squares ensemble can extend its tourism infrastructure in relation with the main routes that connect with the rest of the town (pedestrian route Nicolae Bălcescu, Avram Iancu / Gh. Magheru str., the Stairs Tower and Turnului str., the Stairs and Ocnei str.)*; ***qualifier: high absorption capacity of tourism development****;*
- the main route of pedestrian connection between the central squares ensemble and the rest of the town, Bălcescu str., makes fast connections towards the hotels that are grouped within a certain area at the historic centre periphery, the Iosefin quarter, the Sub Arini Park (with connection towards Dumbrava forest and the Village Museum) and several business buildings; **qualifier: easy connection with the rest of the town**; *the Nicolae Bălcescu pedestrian street can extend its tourism infrastructure, especially in terms of tourism attractions situated in the close proximity of the historic centre (the Sub Arini park, the Village Museum, Iosefin quarter)*; ***qualifier: high absorption capacity of tourism development***;
- Mitropoliei street is an important (motorized) traffic route connecting the periphery of the historic centre to the main squares ensemble; **qualifier: easy connection with the rest of the town**; *may receive a tourism infrastructure in order to consolidate the connection to the central nucleus with the main squares ensemble*; ***qualifier: high absorption capacity for tourism development***;

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[1] In the Upper Town of the historic centre of Sibiu one may distinguish the following areas for the analysis, having specific features corresponding to each of the analysing criterion: the ensemble of the three Squares – Huet Square, Lesser Square (*Piaţa Mică*) and Grande Square (*Piaţa Mare*); Nicolae Bălcescu street; Astra Park and the area of the former barracks 90; the streets Avram Iancu and Gh. Magheru; Cetăţii street; Mitropoliei street; secondary streets in the Upper Town; connection passages (exclusively pedestrian) between the Lower and Upper Town.

[2] In the Lower Town of the historic centre of Sibiu one may distinguish: streets between the Upper Town and the Lower Town; Farului and 9 Mai streets; secondary streets in the Lower Town.

- the Cetăţii street (developed along the defense wall from the third fortification enclosure) has a direct pedestrian connection with the central ring and parkings from the area; **qualifier: easy connection with the rest of the town**; *it may receive a tourism infrastructure easily accessible from all points mentioned above;* ***qualifier: high absorption capacity of tourism development****;*
- both in the Upper Town and the Lower Town, there are two main traffic axes that realize the connection with the railway station: the axis Faurului – 9 Mai in the Lower Town, and the axis Nicolae Bălcescu – Gheorghe Magheru / Avram Iancu in the Upper Town; also, the streets and passages that appeared between the Upper Town and the Lower Town have, first of all, a role of connection between different parts of the historic centre (some of them are even former transit roads), depending on their disposition within the area, being sloping streets or passages with ramps and stairs; **qualifier: easy connection with the rest of the town;** *the main connection routes between the historic centre and the railway station (the station being accessible by pedestrian from both the Upper and Lower Town), and also the connection passages and streets between the Upper Town and the Lower Town may receive a tourism infrastructure (with functions such as public catering or commercial use, facing towards the street, and such as tourism accommodations, facing towards the inner courtyards);* ***qualifier: high absorption capacity of tourism development****;*
- the secondary streets (both from the Upper and the Lower Town) usually do not have a direct connection with the rest of the town, as they only make the connection between the main streets of the area – thus they are rarely visited by tourists; as an exception, the streets that pass through the line of the former fortifications and realize a connection with the rest of the town, are more open to a rapid circulation towards the rest of the town; **qualifier: difficult connection with the rest of the town, only occasionally easier;** *the secondary streets that have a direct connection with the rest of the town, even if not main traffic routes, may sporadically receive a tourism infrastructure because they are more circulated than the other streets; the other secondary streets may sporadically receive tourism functions (accommodation units in quiet places)*; ***qualifier: reduced absorption capacity of tourism development, with moderated isolated accents****;*

Figures 1, 2, 3 *– Images related to the criterion concerning the connection between the historic centre of Sibiu and the rest of the urban areas (along the main traffic axes): in relation with the ASTRA Village Museum and the fortified churces ensembles from Turnişor and Guşteriţa.*

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The analysis performed for the town of Sibiu is much more complex and extended than the brief examples given above, concentrating on all areas and sub-areas of the city that have a connection with tourism according to the seven criteria proposed for evaluation, such that the outcome has consisted of many recommendations for interventions with tourism purposes in all areas of the historic centre, and also, a plan for tourism development.

As a result of the historic centre analysis according to all proposed criteria, one could draw up conclusions (such as recommendations, restrictions, or permissions), and these are proposed to be integrated in the future urban planning regulations, or in tourism development plans, as special sections concerning the development and integration of tourism dimension within the given historic context of the analysed historic town. By separately evaluating every area, one can assess, in the associated analysis sheet, the admitted limit for each situation, thus outlining the limit zones,[3] up to which tourism can develop without affecting the specific features of a historic centre. In the same time, the regulations proposed for each historic area treated according to the sheet (form) of absorption capacity analysis may be used as elements of guidance, to be introduced in urban planning regulations

[3] It is prefered the use of the term *limit zone*, having in view that these are not precise actions, which can be exactly determined (just on the limit), but rather a number of actions (in this case with architectural and urban planning character), which are accepted within the analysed historic centre without its features being affected.

or even plans (as parts specific to tourism development). As a synthesis of the aspects very briefly presented above considering the absorption capacity of tourism dimension, the conclusions of the detailed analyses allow to outline directions of architectural and urban planning actions related to the tourism development in the process of historic centre promotion as the main tourist-historic area of the town, and also for its integration in a larger framework, namely the extension of the tourism area by implementing specific infrastructure outside the centre, in valuable, protected ensembles, but of somewhat more reduced tourist importance. Thus, the main directions for a well balanced tourism development within the town can be schematically synthesized in the following figure:

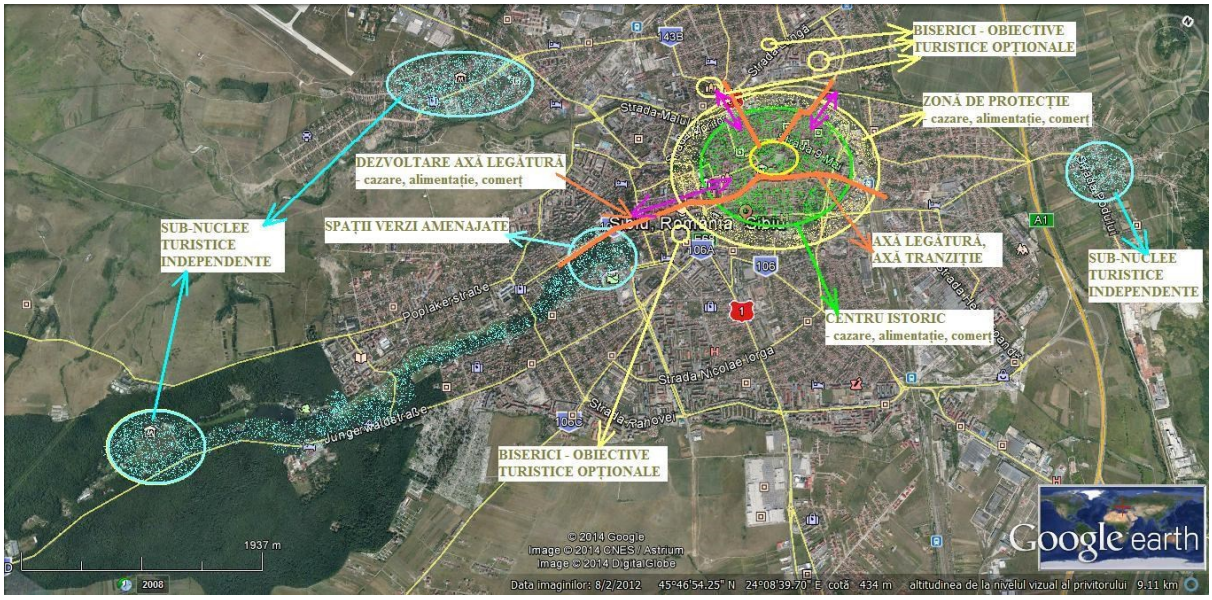

Figure 4 – *Sibiu: main directions of architectural and urban planning actions proposed for tourism*

Concerning the criterion of connection between the historic centre and the rest of the town, in Pécs (Hungary), on the occasion of the European Cultural Capital event in 2010, it was revitalised the former Zsolnay porcelain factories area (as an industrial heritage monument), which was rehabilitated as a self-standing Cultural Centre having the role to relieve the historic centre of tourist concentrations, but also to diversify the offer of tourism attractions in the town. Also, a conference centre and a library were built on the axis connecting the historic centre and the Zsolnay factories, which supplement the necessary tourism infrastructure that could have not been absorbed into the concentration of values from the mediaeval historic centre.

Figure 5 *– Pécs: the historic centre in connection with the recently rehabilitated Zsolnay factories area*

For Sibiu, based on a detailed evaluation of the relationships between the historic centre, the areas from its proximity (such as the area of industrial heritage classified as a protected area Cibin-centre – but practically unexploited in terms of tourism) and the rest of independent sub-nuclei with tourism potential (such as the ASTRA Village Museum, the banks of Cibin river, the fortified church ensemble of Guşteriţa and Turnişor), it resulted that the tourism infrastructure extension can be absorbed towards the area of industrial heritage, a rather appropriate solution by similarity with the example of Pécs.

Figures 6, 7, 8 – *Pécs: The newly rehabilitated ensemble of the Zsolnay factories, and the new conference centre and library*

Also, as it happened in the case of Pécs, in Sibiu it looks natural that the connection axis between the historic centre and the Village Museum, which transits valuable parts of the town (the protected area has architectural values in the Josefin quarters, and also the Sub Arini Park), can absorb and concentrate tourism infrastructure developments in the future, even more than other connection axes between the historic centre and the rest of the town.

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In summary, several architectural and urban planning interventions are considered as significant, as resulting from the proposed analysis of the absorption capacity of tourism development in the historic centre of Sibiu, as well as from the comparison with the study of the historic city of Pécs (Hungary).
In Pécs, within the European Cultural Capital 2010 project, the general directions of architectural and urban planning action targeted a change of attitude with respect to the mode in which the city was looked at, by transforming both the physical medium and the cultural politics: planning of urban culture by conservation, re-invention, and development of urban life in general.
By similitude, in the relationship between the historic centre and the rest of the town, the following directions of architectural and urban planning intervention are proposed in Sibiu in order to develop tourism, by considering several possible extension axes of the tourist-historic city, developed in direct relationship (therefore accessible also by pedestrians) with the present historic centre:

- tourism infrastructure continuation of the Bălcescu pedestrian towards and along Victoriei boulevard, thus realizing a direct connection with the Sub Arini Park and the Village Museum (green areas with a different kind of tourism potential), with transit through the Josefin quarter (rich in representative buildings for the XIXth architecture of the town);

- tourism infrastructure intensification along Ocnei and Turnului streets, in relation with the industrial heritage area and the green banks of Cibin river nearby (already in project of future rehabilitation), making also the connection with the Teresian quarter, well-known for Măierii Sibiului (typical Romanian churches as an additional religious type of architecture for the touristic churches visited in the historic centre);

- setting up of a more direct connection between the central squares ensemble – Bălcescu pedestrian and the Cetăţii street (now perceived as a little excentric in terms of possible ways to connect with other important tourist objectives), by intensifying the tourism infrastructure along the main streets of connection inbetween (e.g., Gh. Lazăr, or Arhivelor and Tipografilor);

- the present urban quarters with the fortified churches Guşteriţa and Turnişor cannot be developed in direct connection with the historic centre, as they are situated in former neighbour villages and later introduced in Sibiu's urban area, in the same time being accessible only by motorized traffic (personal car) or specialized tourism transportation.

4 CONCLUSIONS

In order to develop tourism, investigating the main directions of action related to the most frequently met interventions upon the architectural and urban heritage led to the proposal of an analysis model of the absorption capacity of tourism development within urban historic centres, with the following original contributions:

- setting up of a number of criteria for evaluating the *limit zone* of interventions made with tourism purposes, as well as choice of indicators that create a balanced state in terms of the analysed criterion;

- the proposed evaluation criteria are considered as the most significant for tourism development at cultural heritage destinations, having impact on both tourism and heritage, and especially on the cultural heritage resources;

- the criteria proposed for this kind of analysis may be valid for any cultural heritage destination, and are being specified in the present work for the urban historic centres, as: state of conservation of the historic centre, connection of the historic centre with the rest of the town, elements in the proximity of the historic centre (in some cases, the buffer zone), urban traffic in the historic centre, integration of the tourism functions, urban historic image and elements of urban planning and architectural detail;

- based on the proposed criteria and indicators, this model of tourism development evaluation in urban historic centre environment is able to frame the adequate architectural and urban planning interventions within certain limits, such that the town's peculiarities, defined by its cultural resources, are not affected, but on the contrary they can be capitalized by integrating the tourism dimension; the proposed recommendations may be integrated in urban plans or urban planning regulations, or in proposing an integrated plan of tourism development;

- the proposed absorption capacity model of tourism development, in terms regarding the criterion of connection between the historic centre with the rest of the town, was applied to the historic town of Sibiu, in order to point out the most appropriate architectural and urban planning interventions for tourism development, by comparison with a similar south-eastern European town (Pécs from Hungary); in this way, one could draw up specific conclusions and recommendations for architectural and urban planning interventions that comprise also a tourism dimension.

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DIGITAL DESIGN PROCESS

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Abstract

From the survival need, or driven by his thirst for knowledge, Man has always build himself prostheses that would intensify physical strength, increase sensorial capacity or that enhance the brain functions: memory, judgment, information processing, communicational capacity. Digital technologies were originally used as prosthesis, not in the sense of replacing human involvement in the processes, but acting an extension of human abilities. Gradually, the computers became an associate of our intelligence, a space for developing our imagination and curiosity [1]. The computer's algorithmic logic is insinuating in our behavior, in our logic and in the way we view the world, starting from the auxiliary role of prosthesis [2].

Technology is not only technical, but an active entity that transforms due to the new and different cultural effects [3]. Technology, in this sense, is not an efficiency oriented practice measured quantitatively, but a qualitatively set of relations that interact with cultural stimuli [4]. Digital technology influences the design of objects, which has an effect that influences human behavior and thus causes the production of new tools. The computer is affecting its users, which are influenced by interaction with it and, in turn, have an impact on their environment. This cycle of emerging effects influences our cultural environment [4].

The computer offers the opportunity to designers to combine experience and intuition with logical reasoning, to combine their skills with the rational. As a tool, the computer can help us to achieve a more meaningful process, by helping us give shape to our ideas.

The conventional Computer Aided Design concepts, that mimic pen and paper with the mouse and computer screen, constrain the architectural language through libraries of predetermined architectural elements. The result was limiting architectural expression, using the excuse of increased efficiency and excluding an approach that uses less conventional components and configurations. The current parametric design tools bring more abstract building elements, a system that can modify, adapt, so that designers can make their own vocabulary of components. Now designers have the opportunity to define their own set of tools, but only after having understood and configured the algorithmic and geometric abstract of their intentions [5].

Until recently the architects were waiting for other disciplines to develop tools and select from a catalog of possibilities. By doing so, they are not active individuals and they could lose their culture and characteristics, based of professional experience and knowledge [6]. By integrating software programming into architecture practice, digital tools are becoming themselves designed, and the whole process shifts towards materialization of the project.

Digital technology offers an alternative that has the advantage to use highly generic, adaptive and customizable tools. If the traditional architect had to work within the limits of the available means to manifest their creativity, the contemporary architect has the opportunity to design also his tools and to use them creatively in the design process.

The involvement of digital tools in the architecture practice transforms the core of the creative process. Through computation, the architect no longer designs the form to be produced, but the production process itself. The computational design product is no longer a building's representation, but the process of developing a logical sequence that generates an architecture object, which can be materialized through digital fabrication tools. Thus the design is addressed in abstract terms, in the sense of making connections that link the design principles, from symbolic aspects to materializing methods. In this context, scripting becomes a tool of the mind, evolving from a strictly technical action; it can be applied in architecture practice as a method of communicating the symbolic intentions [5].

Through computational design, the project incorporates the idea and method of manufacture from the moment of its conception. This means that the building materializing process is integrated into the design process, as it was during the traditional craftsmanship period. Mathematics has effectively become an object of manufacture [7]. Through computation the project information is translated into data and linked together into algorithmic structures, processed and finally passed to the digital fabrication tools that are producing the physical object. Computation brings together both the creative thinking and the materialization process, and transforms the design and building process, moving toward a digital craft.

Digital design software today offers the opportunity to encapsulate design thinking in the form of algorithms and code. Architects are therefore able to translate their way of creating architecture into a form making logic. The latest developments in software, such as Grasshopper for Rhinoceros, offer a visual environment for designing algorithms, in which architects are not forced to learn coding, but can work with visual elements. By using such software, all the coding is hidden behind graphical representations that can be linked to form associative and algorithmic designs. The authors will present their own digital design process and their direct experience from working with digital tools.

Today's architects become more that just digital tool users, by using custom built fabrication tools and writing code, they become tool makers, involving themselves even deeper into the process of design and making.

Keywords: digital process, algorithmic architecture, parametric design, scripting, custom design tools, digital craft

1 DIGITAL VS TRADITIONAL

The concept of traditional architectural design today refers to a method of doing architecture that comes from the renaissance, from Alberti, when the dichotomy between Architect, as the one that conceives the building and delivers several representations of that building so that another party, the Builder can read these representations and construct what the architect envisioned [8].

The advances in digital tools for design and fabrication have opened up a possibility to challenge this concept of the Albertian Architect and pave the way to a new kind of architectural design process that bridges the gap between architect and the finished product, in some way similar to the Master Builders in Medieval Era.

The Albertian Architect's end product are representations, most of the time bi-dimensional, of an architectural object. This is how he conveys his design intent. We still have to wonder, now that digital technology has offered better ways of communicating design intent, if this architectural design process is not slowly becoming ancient and if time has risen for an

improvement in the design process. To illustrate the concept of the Digital Architect we propose the term of Digital Craft.

The term craft is lying somewhere between art, which relies on creativity, and science, which relies on knowledge. Thus, due to this second aspect, to master the technology of making, the medieval craftsman had to gain skills, through an apprenticeship process. Only after learning how to use the tools, he was acknowledged in the society. Thus the creative aspect was inseparable from the production process.

The craft has always been the relationship between the material capabilities, the production means and the designer creativity. Artistic invention is highly influenced by discoveries the field of science and technical inventions. As technology evolves through the ages, so does the way that an artisan uses the tools available to him, therefore he is changing the craft. The artefacts, as a result of a design process have always been a reflection of the tools and technologies available at a certain point in history. The digital age offers endless possibilities of fabrication through means of digital production and craftsmen have to integrate the digital into their making.

The artistic creation works with inventively, reveals something that did not exist before. The science is based on discovering, that means to highlight something that exists regardless. Therefore craft is always pushing the boundaries of science trying to go beyond the known, into the realm of discovery. By doing so, craft is the result of merging the design process with the production process. Traditional craftsman were the ones designing the objects and the masters of the production process. Going digital means that designers have to master a digital design and the means of digital fabrication at the same time.

The craft is also defined as the relationship developed between the designer, tools and material. Defines the connection between what the material would like be, the designer intention that is imposed on the material and the action that will shapes the final object. This relationship can now be mediated by the digital environment, by using and adapting all this information, into a process that will anticipate the physical materialization. Doing so, the virtual is becoming an essential tool in materializing architecture. Nowadays, craftsmen have the option to replace traditional stone crafting techniques with digitally controlled industrial robots that can carve any shape out of massive blocks of material.

Further on this paper will discuss how the materialization process had evolved over time as a result of the evolution of the role of the creator, the object and the tools in relation to technological development, in order to understand the emergent role of todays architect.

1.1 Artefact

The characteristics of the objects made by traditional craftsmen are uniqueness, rarity and time invested in their implementation. These features are the result of working by hand, which always produces different objects. On the other hand it is this inconsistency in the production process that has sparked the need for copy.

Making copies started from the aspiration to achieve what no human hand was capable of and focusing on efficiency. Copies came to be mass produced in a continuous stream to justify the costs invested in automation. The exponentially growth of scale was due to its effectiveness, therefore the concept of maximizing, during industrial period, become an optimization method.

A digital designed and manufactured object combines the features of traditional craft with the ones of mass production. Variability is part of the design intent and it can be programmed, and the artefact made by digital means can accept serial variation and differentiation. These

objects have a characteristic, they are different but similar. On the other hand, due to the digital environment ability to integrate, the final object is not an imposition of its author's vision, but an informed response from several factors resulting from analysis and linking a large amount of parameters.

1.2 Tools

Each craftsman guild had specific tools and their handling skill was part of the apprenticeship. In this context, the tool becomes variable only in the hands of the craftsman, the creativity of the craftsman and his skill made the outcome to be different.

Technological development has gradually transformed the craftsmen tools, as manual labor was replaced by machinery, production system became more complicated. Thus, by technological development rather than simplifying the machinery, it got complicated to achieve an automated process. Production machinery was articulated in a very rigid system, unable to suffer variation. Digital tools have the advantage of being accurate, efficient, and have the ability to manage large quantities of data. But this aspect of performance is not enough to justify their usefulness in the architecture practice.

These digital tools can influence the design in the conceptual stage, by exploring the possibilities they offer in terms of creative potential. The new design and fabrication tools are flexible and can be adapted to each specific situation, thus becoming part of the design. This flexibility is dubbed by the ability to integrate the digital tool programming in the creative process by means of algorithms and code, in a similar way in which the design intent is translated into the computational environment. Architects now have a common language, the code, which can link the creative and fabrication processes into an integrated approach.

1.3 Creator

Traditional medieval artisans were at the same time those who designed and masters of the production process. Thus the traditional craft put together the design process with the process of materializing.

Through the automation of the production process craftsmen have been replaced by machines that can accomplish simple tasks more accurate and faster. The machine replaces human labor in production, but humans find themselves reinserted elsewhere, as abstract labor. The machine is no longer a tool in the hands of craftsman but becomes the main producer, supervised by people. Switching to mass production lead to the emergence of the abstract status of the person who designs for the technology in the format required, leaving production at the expense of machinery. Thus the traditional craftsman tasks were divided: production machines dealt with materialization and the designer dealt with the creative aspect.

Through digital technology, designers have the opportunity to get closer again to the materialization of construction, thus becoming a digital master builder. The advantage of digital media is that it provides tools that can be customized for each design. Even more important is that the designer can create his own digital tools, doing so the creative field extends to the tools.

2 TRANSFORMING THE DESIGNING PROCESS

Through digital technology architects have the opportunity to become more involved in the materializing of the project. They can design and adapt highly flexible tools to the architectural practice. The digital environment provides a common ground where creativity is put together with the digital conceptual tools and the digital fabrication tools. However, to

embrace the digital environment, architects will have to assume the character of indeterminacy that is part of the generative process.

This paper emphasizes the new focus of the architectural practice on materializing, arguing for the need to involve digital fabrication methods from the earliest stages of the design process. Digital design and fabrication tools have evolved from simple executors to generating factors in the design process. Thus one can acknowledge the digital tools ability to incorporate information that can influence the concept. By involving digital design tools a new type of exploration of the environment reveals itself, one that encourages imagination.

As the paper stated earlier, contemporary digital architecture practices are trying to connect the contemporary design and the manufacturing technologies with the traditional architecture design without copying industrial processes, but adapting them and using them creatively. This comes as a logic next step in the evolution of the way we design and make things.

Digital technologies try to add precision to the design intent, and can even be used to remove elements unfounded and without substance. By means of abstracting the design process a need arises to be explicit in shaping the concept of the project. This does not mean that digital tools are required to replace the intuitive nature of design. Architecture is a complex process that may combine several approaches, both the precise and intuitive thinking.

Now design should address the production process, not only the form that will be produced. Design should incorporate the idea and method of fabrication since the concept phase. Thus construction is understood as an integrated design process, as it was during the craft period. By integrating scripting into the architectural practice, digital tools are being designed, and the whole process shifts towards the materialization of the design.

Digital technologies tend to bring into practice the concept of craft, as a reference to the time when design was in a closer relationship with the materialization. But digital craft is not a nostalgic return to traditional processes, by replacing hand tools with digital ones. Nor it is a digital resulted process without a creative input. By using these new tools, the work process and the approach of the designer are also changing. Digital craft combines the features of automated production with the ones of traditional craftsmanship, putting together the precision, consistency, predetermination with the designer's subjectivity and creativity.

Digital technologies have changed, to some extent architectural practice, but rather as a natural evolution and appropriation, than as the revolution proclaimed a few years ago. Fascination for novelty, accuracy and efficiency that characterize digital tools turned into a critical approach. Today the challenge is to adapt and transform these digital technologies originally designed for other purposes and using them creatively in architecture.

The computer is no longer a means of representation, but a generating tool, a part of the design process. The architect is not a demiurge creator from the past, he became the one who makes the link between concept and construction, through the digital environment. Fabrication has evolved from a means of production to a significant element in the design process.

Our own practice is based on the use of computational tools in design and digital fabrication for the development of architectural artefacts. We use code as a common language between the design intent and the fabrication machines, bridging the gap between the designer and the finished product. By means of a visual programming environment linked to a 3d modelling platform (Grasshopper for Rhinoceros 3d) we translate the design intent into an algorithm. We incorporate a series of formal generators, such as physical forces form finding, that develop the form starting from simple geometric generators.

Furthermore the algorithm is developed to take into account also the fabrication process and optimizes the shape so that it is buildable. This is not a fully automated process, but the model highlights problem area and the designer can make modifications in the design. The algorithm will instantly regenerate the shape thus reducing time for corrections. When the final designer decides that a shape suits all the criteria for the design, based on information calculated by the algorithm, a next step of the algorithm processes the model and fabrication data is generated, whether this means generating code for a machine to process or tri-dimensional and bi-dimensional representations for each individual component. The fabrication data is then sent to a digital fabrication machine that will physically produce the object or component.

This workflow allows us to quickly explore design options and also makes it possible to generate a different shape each time the object is produced. Therefore the algorithm becomes a highly customizable tool for shape generation that can accommodate the needs of each client or for each particular situation.

By implying an algorithm in the design process, the designer relinquishes a part of his control and enforces his will by means of the computational prosthesis. This in turn allows the designer to control complex processes and large amounts of data, intricate geometry and various design inputs. The computational process delivers another kind of control over the finished product, creating another balance between the demiurgic will of the creator and the power of user customization. One might say that designer become masters of a process, instead of a finished product.

2.1 Case study QUAD_LIGHT

QUAD_LIGHT is a design object developed using digital tools, whose geometry and concept are born from the creative interaction between architects and the computational environment. The concept for this object lies in the freedom to find its own form. Although it is a created object, the shape is not imposed, but digitally generated. The process requires an input related to the overall characteristics and then, the form is generated simulating elastic and gravitational forces. The form lays in the task of the computational environment, and in this case the design was one concerning the generation process, not the object's shape.

The computational environment is used both as generator, and for the performance analysis and simulation of physical forces that act upon the geometry. Modelled using advanced digital tools to simulate gravity and dynamic relaxation, QUAD_LIGHT had a fluid shape that is made up from quad subdivisions. Using the plugins for visual programming Grasshopper and Kangaroo for Rhinoceros, we managed to control the overall form.

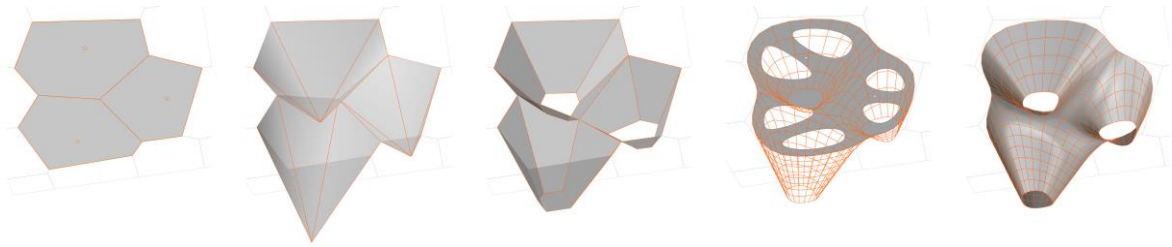

Fig. 1. Form finding digital process.

The resulting shape of each QUAD_LIGHT is developed so that once assembled it will hang gravitationally and take the shape of the digital model.

Using parametric design software and using an algorithm for design allows the customization of the form for each user and the generation of the fabrication information for each component. The shape is not imposed, it is searched for, and it is each time different, adapting

to every users personal needs. The process variables are the global dimensions of the object plane, the cone number and height, the geometric layout and the aggregation specifics that can foster both a linear orientation or concentrated.

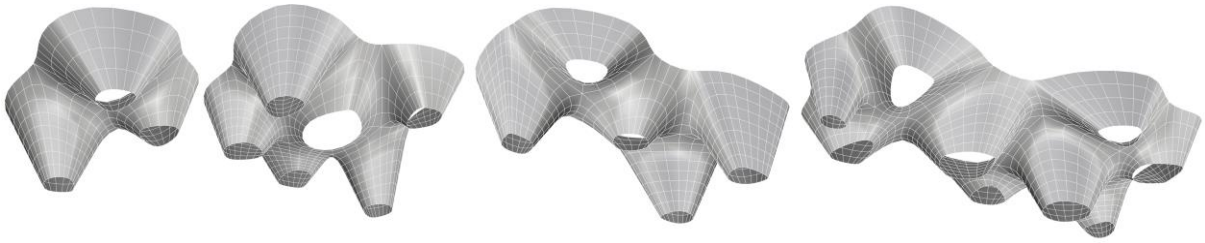

Fig. 2. Formal variation.

The object geometry is a soft one, as a result of the digital form finding process that simulates a hanging structure. The resulting geometry is a complex surface with double curvature, which has to be fabricated from planar surfaces. To physically conceive this fluid form, the overall geometry is subdivided into components with a rectangle shape whose size is controlled.

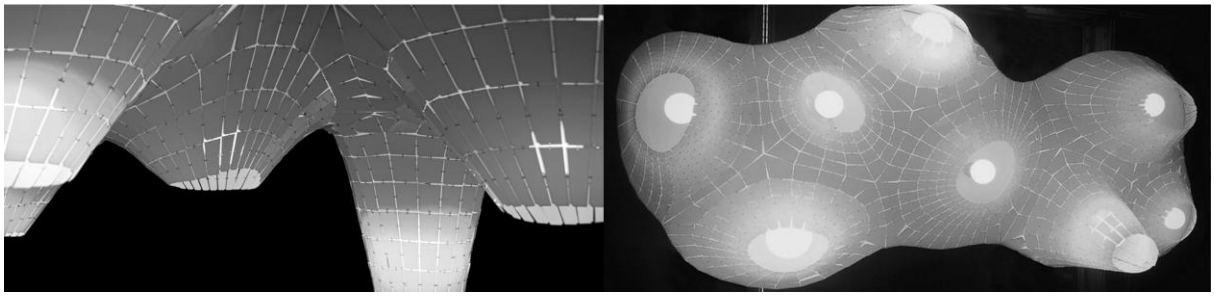

Fig. 3. Surface subdivision.

Using visual programming software we managed to obtain a continuous digital workflow from design to manufacturing. Thus the fabrication process became part of the algorithm, occupying a significant percentage. Because the object components are different planar elements, the fabrication was done by laser cutting. The algorithm allows the direct transfer of the information in the digital model to numerical controlled machines for the production of each individual component. Components are then manually assembled, therefore combining craftsmanship with the digital production.

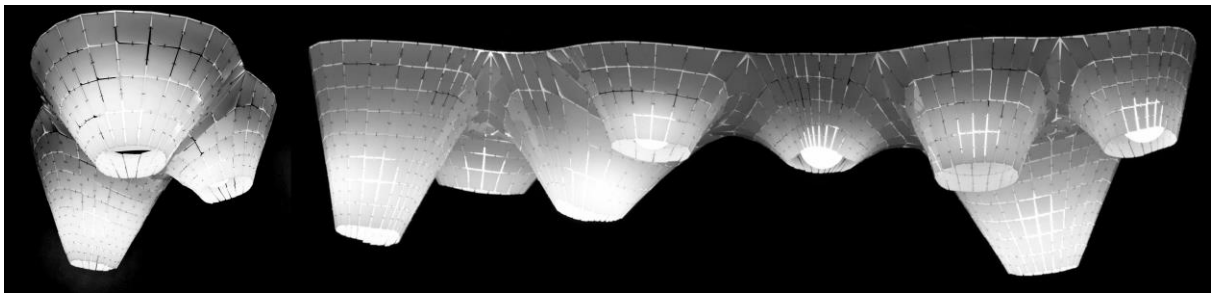

Fig. 4. Physical object.

The algorithm contains constraints regarding the manufacturing method, if a piece had a too small size, this problem was reported, and by modifying parameters it was avoided. The algorithm also incorporates calculations related to the cost of production. Thus it calculates total length for laser cutting, associated with several types of materials and thicknesses, allowing a comparative calculation, including percentage and losses. In order to use as little

material as possible, an efficient automatic nesting algorithm was used that positions the pieces on the standard format of plates that will be cut.

3 TOWARDS A DIGITAL CRAFTSMAN

From a designer point of view, technology was inflexible, one works with what one is provided with. An issue was also the fact that the relation between the designer and the production tools was mediated thru other professionals. And, as we already discussed, this led the architect to lose touch with the production process and to assume a more abstract status. Through the digital technology the architect is provided with an opportunity in designing and adapting highly customizable tools, used in both digital design and fabrication.

The digital designer must assume the fact that he has to lose the power of control in some aspects of the design process, to gain a higher involvement into the project. Digital technology provides a common ground were the designer creativity is put together with digital conceptual tools and digital fabrication tools, in a very flexible feedback relationship. Ironically, by proposing a negotiation between design, fabrication and computation, through digital technology, the autocratic aspect on technology is dissolved. Thus, by using digital technology in the architecture practice from concept to the fabrication, one has the opportunity to obtain a unique specific response, more informed, local adapted architectural object.

The designer should have other concerns than delivering things on time, with the right level of detail and at a fair price. With this attitude he might lose the opportunity of a creative approach, to see what the possibilities are, maybe explore a more flexible alternative to conventional practice, just through direct interaction with a tool [9].

Architects should not be seen only as abstract conceptual providers, who refuse to handle numerous aspects of the project classified as unworthy of their attention, because it deals with elements too technical or insignificant. Thus the architect's role is undergoing a renegotiation, in the sense of direct and active involvement in the digital environment design and manufacture, instead of passively waiting technology to appear around him. Using digital environment attributes, designers are provided with the opportunity to apply their knowledge and regain credit, in terms of interdisciplinary expertise. Architects need to actively develop their own design culture, meaning to make their own technology as part of their professional practice.

By using digital technologies the architect is challenged to assume more responsibility primarily because the information is integrated and secondly because the production method is significant for the project design, and can itself be created for each project part, with the direct involvement of the architect. Thus architects are responsible to develop the conceptual and physical tools so that will contain attributes, information and knowledge specific to the architecture practice.

The technological development has always been linked with the architecture practice and design. But we have yet to appropriate these foreign objects, migrated from different technologies, designed for other processes.

Both the digital conceptual tools and the digital manufacturing tools have become appealing for architecture processes, due to the fact that architects are among the few providing custom design services that lead to a final custom object. This uniqueness of the final architecture product was achieved, using, in a different way, a range of prefabricate standard components and as few as possible custom elements. This approach indicates the lack of creativity and flexibility brought by the materialization processes into the project design. The digital

technology makes possible, not only the designing and producing unique objects, but, more important they offer possibilities that creatively can contribute to the design. Thus the advantage that these digital tools provide is not the high-tech factor, but the fact that both computers and machines are highly customizable for a variety of processes.

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