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What Tools and Modes of Representation to Reflect an Architectural Atmosphere?

For about thirty years, research in French architectural schools has been involved in the question of atmosphere (1), especially thanks to the contributions of CERMA (Centre for Methodological Research in Architecture) and CRESSON inside the joint research CNRS unit "Architectural and Urban Ambient Environment". The theoretical knowledge finding its source within this framework follows two complementary directions: the first being a sensitive approach and the second a technical approach. Atmosphere does indeed come within a spatial experience, but the physical phenomena it is made up of, take into account specific knowledge and know-how such as lighting, thermal physics, acoustics, etc. (2)

The study presented here is a part of a PhD work of which the aim is to qualify the atmosphere representation produced by architects during the different conception stages. We suggest a reflection on conception methodology so that the initially suggest atmosphere lasts all along the conception process and in the lived spaces.

In this paper, we are more particularly interested here in the manner in which atmosphere is represented by the architect during the conceptual phase. An architect must indeed produce images to give shape to his project and to communicate it. The question will be asked about the capacity of pictures to translate atmosphere intentions. Two different buildings, whose respective architects had foreseen their atmospheric intentions, before the designing stage, will help us in our study. This way, we will analyze the reasons which motivated the building designer's choices in the production of atmosphere representations: how does the architect get to suggest feelings through image? What tools and modes of representation does he mostly use?

1 The word "atmosphere" is used here for translate the french word "ambiance" that is both a sensitive approach and a technical approach of architectural and urban environment

2 See the article from Jean-François AUGOYARD: «A comme Ambiance(s): un singulier fugace, un pluriel éparpillé». Les Cahiers de la Recherche Architecturale et Urbaine n°20/21, March 2007: p.33-37

1. Every sense is mobilized by the representation of atmosphere in architecture

Atmosphere helps to reveal architecture by the use of our different senses. This is how we create our own personal experiences. An architect who is willing to reveal his architecture should therefore give a representation full of sensitivity and emotions which will qualify his projected building. Meanwhile, the representation of architecture is mostly visual, Eric Lapierre (3) agrees with the idea that: "*Image has always constituted one of the main means of knowledge and diffusion of architecture,*

Figure left: View on the children area; source: pictures from the Bains des Docks' video, AJN, 2004

3 See the work from Eric Lapierre: Architecture du réel, architecture contemporaine en France, Paris: Le Moniteur, 2003, 316p

through compendiums and architecture treaties." Moreover, the primacy of vision over the other senses is not recent. At the end of the 17th century, Philippe Gresset (4) said that a "*hierarchy of senses places the eye as the main perceiving organ*".

The question that can be asked is whether image is able to translate projected atmospheres through all five senses, or not and finally, how to perceive with all our senses through sight only. Marc Crunelle (5) admits this difficulty with these words: "*Experience of architecture is indeed multi-sensorial and the fact of reducing this multitude of impressions to drawings and pictures amputates it from a great part of what it is made up of.*" But he goes further by insisting on the fact that a non represented atmosphere is a forgotten atmosphere, neglected during the conception of architecture: "*Our modes of representation, based primarily on sight, the impossibility of visualizing a smell, poverty of language to qualify a scent, partially explains the lack of attention given to that sense.*" He is here mentioning the olfactory atmosphere, but this remark can be extended to the whole of the invisible atmospheric parameters. The question of atmospheric representation will also be asked concerning the study of the varions atmospheric parameters based on the laws of physics: their evaluation by numerical simulation questions the way to communicate the results and to reveal phenomena which are not visible.

So, we shall question the way an architect communicates his intentions during the conceptual stage and especially the atmosphere intentions he is projecting and what tools and modes of representation he uses during the architectural conception.

2. The 20th century is a historic turning point in the representation of architecture

To create his project and its associated atmospheres, an architect has, down through the eras, used various tools and modes of representation.

In France, architecture was taught in the Beaux-Arts school until 1968. It was only at the beginning of the 20th century that we observed a real change in architectural representation which created a rupture with the established codes. At the end of her work, Simona Talenti (6) says that the start of the 20th century marked a great evolution because of the change in focus of representation. The aim was no longer only to show projected architecture but also to understand it, to make it live; that's why

4 See the work from Philippe Gresset: L'écart du système, critique des relations entre les figurations et discours instaurateurs du bâti à l'âge classique – 1665-1720, Paris: Corda, 1977, 161p

5 See the work from Marc Crunelle: L'Architecture et nos sens, Bruxelles: Presses Universitaires de Bruxelles, 1996, 143p

6 See the work from Simona Talenti: L'histoire de l'architecture en France, Emergence d'une discipline (1867-1914), Paris: Picard, 2000, 290p

atmosphere was present in representations of that period which included self personal experience. According to Anne-Marie Châtelet (7), the 20th century was also marked by a remarkable evolution in architectural practice: "*This century will also have been the one of technological progress. Sensitive innovation in the construction field also appears in the representational one*." In fact, we observed a change in the architect's representational tools: "*We went from watercolor to virtual representation in a couple of decades*" which led to new modes of architectural representation. Computers not only modified our working habits and generated new architectural shapes, but also produced more or less realistic images thanks to photomontage and to the modelling of projected spaces. Light was then systematically going to appear in those new means of representation.

Furthermore, evaluation of the atmosphere's physical phenomena by numerical simulation is only possible thanks to that tool. Improved computer performance is possible with the increasing capacities of computers, this will allow rapid visualization of the results. As Gerard Monnier (8) underlines, numerical tools will continue to improve, increasing their power in the decades to come: "*The most spectacular results are those involving numerical simulation, virtual images, animated or still, using incomparable representation processes with traditional techniques; going as far as putting to one side axonometric perspective and its code, replacing it by images similar to the ancient "aspect perspective"*.

In the meantime, architects have not abandoned sketching for computers, the former being, according to them, a means of more spontaneous expression during the conceptual stage. In this respect, Jacques Déthier observes, in his work: *Images et imaginaires d'architecture* (9) that these new tools have, paradoxically, generated a rebirth of architectural drawing in the early 1980's. Pencil allows sketching, which is impossible with numerical tools. Moreover, computer images don't have the sensitivity which sketching has. We will see later that some contemporary architects use sketching mostly to translate their atmosphere intentions, whereas others prefer to exploit new possibilities offered by computers.

So, to communicate the atmosphere he or she is projecting, an architect has always used different tools and means of representation. The 20th century particularly, was marked by the change in tools and modes of architectural representation, from the traditional use of pencil for its sensitivity, to mastering of

7 See the article from Anne-Marie Châtelet: «L'architecte dans l'Europe Libérale». Histoire de l'Architecte, Callebat L. (edited by), Paris: Flammarion, 1998, 287p., p.247

8 See the work from Gérard Monnier: L'architecture en France, une histoire critique 1918-1950, Paris: Philippe Sers, 1990, 483p., p.62

9 See the work edited by Jacques Déthier: Images et imaginaires d'architecture, Paris: Centre Georges Pompidou, 1984, 434p

computers to produce more or less realistic pictures or to physically evaluate atmospherical phenomena by numerical simulation.

Our interest will bear on atmosphere representation produced at the end of the 20th century and at the beginning of the 21st century. Thus, available tools for the contemporary architect are numerous and diversified, the question to be raised is the manner in which he or she make choices in order to translate his atmosphere intentions: which tools and which modes of representation does he mostly use?

3. Architectural atmosphére representations of the Bains des Docks by Jean Nouvel and of the Therme Vals by Peter Zumthor

We shall present two ways of working of two contemporary architects who both have a different sensitive approach to atmosphére, by confronting their works and their iconographical atmosphere representation produced for two buildings: the Bains des Docks (le Havre, France, 2008, Jean Nouvel) and the Therme Vals (Vals, Switzerland, 1996, Peter Zumthor).

Both buildings naturally questioned atmosphere. Both establishments are places where bodies are undressed, mobilizing more senses than usuel, such as light or acoustics. The body, out of its textile protection, is now vulnerable to the variations of its close environment: temperature and movements of air, material of the flooring and on the walls, ambient humidity, etc. Furthermore, these are places dedicated to relaxation and dawdling. Activity being reduced to near minimum in this place, the users are receptive to perceptions of their body and to the surrounding architecture. We suppose that the architect, who takes into account the fact that the users don't frequent the building on a daily basis, will conceive the problem of atmosphère in a particular manner.

The Bains des Docks and the Therme Vals are both in different contexts, from a climate point of view as well as from the nature of the close environment. While the Bains des Docks benefit from. a maritime influence, the Therme Vals is influenced by a more severe Alpine climate.

Moreover, the Bains des Docks are in a evolving urban context – the Havre harbour-, whereas the Therme Vals is situated in a verdant valley, in a small Swiss village. Besides, the two buildings show formally different architectures even though the Therme

Vals was part of the references quoted by the Bains des Docks' designer, Jean Nouvel. They meanwhile present the same orthogonal shapes in their interior volumes. They are both constructions which include various temperatured baths, changing rooms, interior and exterior spaces accessible by a warm lagoon of water, relaxing spaces, a bubbling bath for the Bains des Docks and a perfumed bath for the Therme Vals.

The first produced representations that we know of, were on the occasion of the competition launched by Le Havre town and by the commune of Vals. In both cases, architects had given atmosphere intentions at that stage of the architectural competition.

In the case of the Bains des Docks at the time of the competition, the Ateliers Jean Nouvel (AJN), had highlighted two main atmosphere phenomena: the control of sounds and the lighting effects. Light comes from zenithal openings so the rays of light illuminate the baths until the *"heart of the mass"*. The acoustic of the building is improved thanks to cladding materials which reduce reflection of acoustic waves and thus avoid the traditional hubbub in the pools. Whereas Peter Zumthor had worked on different sensations in the various stone blocks containing several baths for the Therme Vals. In fact, Peter Zumthor plays with the sensations of the users' naked bodies. So he accentuates a unique sensation in each stone block which constitutes the building. This is how the hot bath and the cold bath, with extremely different temperatures (42°C and 14°C) allow thermal contrasts, whereas the flower bath offers a neutral temperature but a unique marigold perfume. As for the sound bath, it is made into a shape of a grotto, where the soft lighting encourages hearing. Pushing his thinking further, the architect offers a block where the Vals water can be tasted .

According to Patrice Goulet in his work named *Jean Nouvel* (10), words replace drawings in the French architect's conception process. Then, after a period of "maturing", which is the equivalent of putting the concept into shape, words become numerical pictures or eventually sketches from his partners. The AJN also work with the help of models for the global volumes of the construction but not for the atmosphere. Images are put in place very quickly in the designing process; pictures with different point of views are used as elements of discussion and of exchange between Jean Nouvel and his collaborators. The pictures therefore created by those exchanges between partners of the project become the future pictures which will give birth to the

10 See the work from Patrice Goulet: Jean Nouvel, Paris: Editions du Regard, 1994, 262p; "His working method was-and still is-very spectacular […] because Jean Nouvel refuses categorically the sketching domination, and claims a preliminary focus, of a long and hard concept able to define with the greatest possible pertinence the "formation rules" which are used to determine each and every project, and reinforce their coherence […]. Line is a jail, drawing is not an aim-it's just a mean to allow execution and entertain seduction. This refusal is even more justifiable because if sketching tends indeed to explain a detail, it becomes fast enough a narrow instrument to talk about complexity or transparency, density or light." p.12

Figure 1: View on the public entrance

Figure 2: View on the exterior lagoon

Figure 3: View on the children area

Figure 4: View on the water therapy space

source: pictures from the competition panels n°05 and 06, international competition for the "Centre de la Mer et du Développement Durable et complexe aquatique du Havre", April 2004, AJN.

project in its ensemble and ensure its unity. Thus, on the occasion of the competition for the pool, the AJN produced pictures, thanks to numerical tools, which highlighted the lighting effects resulting from rays of light bouncing off the water. Those effects are furthermore described in the architectural notice that accompanies the competition panels: *"Spaces evolve to the rhythmic sequential variations of natural light […]. The noise of the water's lapping reflects itself on the walls and ceilings, and its multiple images sometimes get mixed up with the projected pictures on the same walls and ceilings […]. It is indeed a game of shadows and light that is set, this game being amplified but also diffracted by the multiple reflecting surfaces which are the essence of this game. Users participate in this amplification phenomenon and the luminous effects increase, depending on the activity in the pool."* (p.6)

In addition to those language descriptions, of those projected atmospheres, architects have represented in pictures four different interior spaces on the competition panels: a view of the public entrance (Fig. 1), a view on the exterior lagoon (Fig. 2), a view on the children area (Fig. 3) and a view on the water therapy space (Fig. 4).

The projected atmospheres in the changing rooms are described in the following text: *"These changing rooms are divided into six block spaces, separated by gaps in between them, where the presence of water, vegetation and zenithal lighting creates a calm and peaceful atmosphere. We won't find the noise and atmosphere of a classical pool here, but the intimacy of a confined room, inviting and naturally lit."* (extract from the competition panel 1a).

Concerning the sonorous aspect, designers' intentions have been described in words in the architectural note which accompanies the competition panels: *"The different water noises are present in the fun pool: the noise of dripping water, of the lapping water, of projected water and of rainwater. All these movements of water are present, highlighting their acoustic aspect."* (p.6)

At the time of the launching of Vals competition for the future construction, Peter Zumthor was a relatively unknown architect. He then presented a very strong "vision" of what he was projecting, for the communal thermal baths: *"My way of inventing architecture always starts with a strong image. It's an idea of the visualization of a physical or corporeal event. The contrary of an abstract idea.[….] During all the building process, I*

make sure that this image becomes architecture, an architecture existing for itself." (11) Peter Zumthor resumes his architectural and atmosphere intentions in three words which have guided the project the whole way through: *"Mountain, stone and water. These three words played an essential role at the moment of translating the first ideas into first sketches, and then to give to the project the shape of models and plans."* (12)

In his sketches of the Therme Vals done during the drafting stage, Peter Zumthor chose to use charcoal on tracing paper and reveals in his drawings the main guiding elements for the project: mountain is in thick black liner, water in blue pastel and light is represented in fine lines of yellow pastel going in between the stone blocks' chinks.

We then observe indications of water temperature and hygrometry rate with annotation notes and flat tints of red or blue: *"The idea that the task of creating an architectural atmosphere also comes down to craft and graft. Processes and interests, instruments and tools are all part and parcel of my work."* (13) The choice of the representation tools has several explanations. The first concerns the particular specifications of the developed project: charcoal allows efficient representation of the heavy stone blocks from the mountain. Moreover, Rainer Weitschies, Peter Zumthor's collaborator, affirms that pastels are easier to use, without any restraints: *" […] with charcoal, it goes quite fast and it is effective, so we use it quite often […] All along there are sketches […] To make something new and evolve, we have to sketch to understand with very thick 6B pencils, but once we know how it will be and only then, we draw with the computer."* (interview of Rainer Weitschies on the 11/07/2009 in Haldenstein).

At the end of the competition launched by Le Havre town, the project manager asked the AJN to produce an animated movie to retrace a path through the projected building (Fig. 5 and 6). The aim of this video was first to help to understand the complexity of volumes projected. We shall add that the video also allows highlighting of atmosphere intentions. The temporal dimension this new mode of representation which was included at the end of the 20th century, is indeed interesting and justified. In our case, it helps to put the lighting effects present in the pictures and in the architects' words into movement and in that way to reveal them.

However, none of the future users of the building are represented in the video even though they participate in creating

11 See the work: Architectures, R. Copans, S. Neumann, photographs by P.O. Deschamps, Paris: Hachette Livre, Arte Editions, Editions du Chêne, 2007, 189p., p.141

12 See the work: Peter Zumthor, Therme Vals, texts by Sigrid Hauser et Peter Zumthor, photographs by Hélène Binet, Infolio Editions, 2007, 190p., p.142

13 See the work: Atmospheres, Peter Zumthor, Berlin: Birkhäuser, 2006, 75p, p.21

Figure 5: View on the balneotherapy area

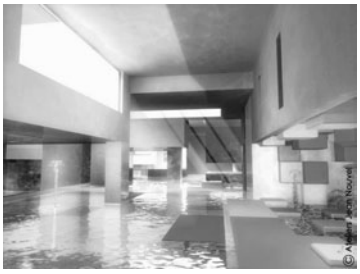

Figure 6: View on the children area; source: pictures from the Bains des Docks' video, AJN, 2004

the atmosphere. This is why the AJN have included sound effects with the voices of the different users depending on the different locations in the building: dynamic children shouting in the fun-dedicated spaces and the relaxing sound of water flowing in the calm spaces of water therapy. Furthermore, AJN use different means of atmosphere representation at the time of the building stage. They estimate the luminous phenomena with numerical simulation in order to forecast as precisely as possible, the real atmosphere of the building.

At the same time as the sketches done during the sketching process and until the beginning of the building site, Peter Zumthor and his collaborators worked on pictures of models to test the effects of light on the materials. The stone models were plunged into water to be able to observe the effects of the luminous slits on the wet stone.

The section sketch shows the light filtered by the narrow slits and lighting up partially the interior spaces. The model allows very clear observation of the luminous effects which *"caress the stone"*. This is how at the time of the drawing of the first sections and plans, the size of the zenithal slits was decided to measure 8 cm precisely. The model pictures today are part of the last traces of the conceptual process that lasted over ten years.

We must also add, that sound has been the object of special reflexion on the architect's part in the Therme Vals until the construction stage. The building was said to be noisy because of the sonorous waves bouncing off the water surfaces. The architect first thought of correcting that effect, but then, while visiting the construction site, he decided not to, saying he would "not cheat" as explained by Peter Schmid: *"He (Peter Zumthor) had invited one of the best acoustic engineers who explained: 'The sound is going to be like in a church, of course there is going to be an 11 second echo' […] and at some stage Peter Zumthor really thought about it: 'do we have to do things to really control echo, not to have too much noise inside?'. At some point, I was accompanying him on the building site, which was already advanced of course, and he said: 'No, finally, we are going to have the sound of the room and we won't manipulate it.' I find it beautiful, we must not manipulate concerning sound."* (interview of Peter Schmid on the 10/07/09 in Vals). Except for these oral quotations, there are no representations left concerning the sound parameter. There is no known evaluation by simulation, but only experience which allows the architect to more or less foresee the sonorous atmospheres in his building once it is built.

The comparison between the two selected buildings through their representations is even more interesting because of the different tools used. As we have just seen, Jean Nouvel only uses numerical tools to produce virtual pictures and movies, whereas Peter Zumthor is closer to tradition with the use of pencil and of charcoal.

Numerical tools are mainly used by the AJN to communicate their architectural intention and especially their atmosphere intentions during the conceptual stage of the Bains des Docks. The following quotation of Jean Nouvel confirms this: *"If I want to show people what I have in mind, like giving a key to my clients so that they can understand the project, 3D representation is an element that works for objectivity and not illusion."* (14) Jean Nouvel justifies his choice with the shortage of subjectivity it seems to offer, with the views of the projected spaces as they will be seen once the building is finished: *"As for me, I try to do things so that every thing is represented as the eye sees it, so that the representation stays as close as possible to reality, so that it aims at translating an illusion of reality. You know that it is still an illusion but I think the computer makes information concerning the future reality of the project more precise than it used to be. The question that begs an answer is to know whether these images are real or not…"* (14) We can qualify the Jean Nouvel's approach as "digital" because of tools he uses and because he conceives architecture with language and digital images not with materials, models and pencils as Peter Zumthor does.

As for Peter Zumthor's representations, they have a totally different aim from the French architect's one. They are sketches and hand drawings where he tries to go beyond what the eye can see, he is trying to give life to the building through his drawings: *"I develop my drawings up to the moment of expressivity, where the foreseen atmosphere becomes perceptible […] Similar to a sculptor's rough shape, it is not only an idea's representation, but it is entirely included in the creation work which stops in the finished object."* (15) The Swiss architect explains that he is trying to reach the public's sensitivity by letting imagination and personal interpretation loose: *"When, in an architectural representation, realism and graphic virtuality are too present, when there is no place left to the imagination creating odieuses for the reality of the represented object, then representation itself becomes the subject of our expectation, and desire for the real object fades away. There is nearly nothing left to the imagined quality, to what is out of representation."* (15) Both

14 See the review A+U, «Jean Nouvel 1987-2006», April 2006, 312 p., p.138

15 See the work: Penser l'architecture, Peter Zumthor, Basel: Birkhäuser, 2008, 95p

architects develop atmosphere intentions during the conceptual phase but each produces a different typology of representation. We wonder about limits of these approaches. On the one hand, the digital approach integrates light and acoustic aspect but it doesn't refer to measured physical atmosphere parameters. On the other hand, the analogical approach seems reliable because models offer a visual representation of atmosphere close to the reality but the small scale restricts the observer to picture himself in the future building.

This is how we linked up atmosphere intentions from both buildings which were planned by each respective architect and some of the iconographical representation produced to translate those intentions. These two architects give us their approach to atmosphere through these representations.

We saw that Jean Nouvel's words during the conceptual stage and iconographical representations are very rich in atmosphere intentions. The emphasis is laid on atmosphere in the produced representations, in order to highlight the project's characteristics and therefore to better communicate the architectural intentions which give shape to projected spaces and to their associated atmosphere. However, giving the illusion of the reality to come is still a relatively complex matter that numerical tools cannot yet fully satisfy. Certain architects thus expose themselves to remarks or criticisms of experienced atmosphere compared to the initially projected one. Jean Nouvel himself is confronted with that difficulty in the entirety of his productions: *"I put myself in danger in those visual documents. Because it's really hard torepresent a thing precisely before it is built."* (14)

14 See the review A+U, «Jean Nouvel 1987-2006», April 2006, 312 p., p.138

The basis of Peter Zumthor's work in architectural conception seems to be atmosphere. The produced representations of interior spaces are accompanied by the words of the architect. These words develop a very strong and concrete vision of the coming reality as he sees it. His capacity to translate and share his architectural project through his own words and his sketches allows him to make his building live even before it's been built; the initial representations are not supposed to show the reality of the future atmosphere of the place, but to convey the atmosphere.

Finally, we have presented two typologies of atmosphere representations, but others also exist presenting other qualities. In our future work, we plan to study another building whose architect produces representations of physical phenomena.

Actually, the new issues about sustainable buildings increase the number of evaluations by simulation during the conceptual phase. This technical approach of atmosphere generates news modes of representation which we will analyse in our work to be continued.

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