Towards an architecture of experience

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Introduction

Many urban and architectural designs bring about a different experience in its visitors than the designer originally intended. Typical architectural qualities such as ‘dynamism’, ‘harmony‘, ‘lightness’ are often guiding themes in the design, but hardly ever experienced in reality when the design has been built. Especially the notorious grand schemes of sixties and seventies, intended to give lots of open green space and fresh air to its inhabitants, are experienced differently — nowadays people mostly experience them as unsafe and cheap. Luckily, there are also some examples of designs that are able to bring about positive experiences in its visitors, some of which are included in this research.

The fact that many designs do not afford a positive experience is the problem that is addressed in this project, of which this written research is a part. It is due to a lack of knowledge of experience and a decent method for designing an architectural experience that designers fail in their attempts to create a positive experience. This research aims to fill that hiatus by providing relevant knowledge of perception and experiencing and a preliminary method for design.

One of the reasons why experience is undervalued as a design property is the problem of a lack of common ground or consensus on the topic of experience and of the effect of the environment on behaviour. Therefore, the aim of this research is to find or construct a theory of experience that can be used in the practise of designing an architecture of experience. Additionally, it can be used for reviewing and assessing architecture’s experiential aspect. The main question that guides this research is:

“How can the architectural experience be understood in a way that it can be implemented into a method for design?”

In order to find the answer to this question, several subtopics and subquestions need to be dealt with. First of all the questions of predetermination of experience needs to be answered: Are certain sensations of external phenomena directly related to certain specific experiences? And if so, what phenomena are those and could they be architectural elements, such as colour or shape? Can these predetermined experiences be replicated using architecture?

The grand schemes of the sixties and seventies, here the Bijlmermeer, were intended to provide the inhabitants with plenty of car-free green space, light and fresh air. Instead the open spaces and the stacked dwellings and infrastructure are often experienced as cheap and unpleasant.

The second, very much related, problem of a conception of experience is that experiences of people of the same environment are sometimes radical different. Whereas one might think Rem Koolhaas' buildings are fantastic, another might experience them as unpleasant and impractical. Why is it that we like some spaces, whereas we strongly dislike other? What ís experience? What is the role of recognition and association in experiencing? Chapter one tries to answer the questions of these two subtopics.

Thirdly, this conception of experience needs to be translated into a theory that can explain in our experiences of everyday life, including our experiences of our urban and architectural surroundings. We need to know what we look for in places, which elements influence our experience. What is it that makes us feel 'at home'? What gives us the experience of unpleasantness? And what role do typical architectural elements such as scale and materialisation play in the experience? These questions will be discussed in chapter two.

Approach

The research started with the careful description of the most profound architectural experiences that I have had. These descriptions served to test any theory of experience. If the theory was not able to explain those experience, it automatically failed as a general theory of experience. These case studies comprise the experiences I had in the Bruder Klaus Kapelle by Peter Zumthor, in the Jewish Museum by Daniel Libeskind, in the Holocaust Memorial by Peter Eisenman, in and around the Notre-Dame du Haut by Le Corbusier and inside Karl Friedrich Schinkel's Neue Wache of which the interior was designed by Heinrich Tessenow. For reasons of readability, these descriptions are not included fully in the main argument, but only occasionally referred to. The full descriptions can be found in the appendix.

After these initial descriptions of experiences, an attempt at answering the research questions and finding an explanation for the experiences above were made, in order to find a generally applicable theory of experience. To do so, two seemingly opposing fields of thought in philosophy and psychology were investigated for their ability to explain the experiences and the emotional reactions in the case studies and for their ability to provide an answer to the problems of predetermination and individual differentiation of experience.

The first of these two fields is what is called behaviourism in psychology, rationalism or naturalism in philosophy and mechanism in biology, a field that offers an anatomical and physical approach towards behaviour, perception and experience. Works of philosophers such as Descartes and psychologists like B.F. Skinner and Ivan Pavlov were reviewed and put to the test.

The second of these two fields is called Gestaltism in psychology and phenomenology in philosophy. It offers a more holistic approach towards behaviour, perception and experience, but for the same reasons it is not physically verifiable. Here, the ideas of psychologists such as Kurt Koffka, Max Wertheimer and Abraham Maslow and the philosophy of Maurice Merleau-Ponty were reviewed for their ability to explain experience and to answer the research questions.

These two fields will be discussed in chapter one. Additional examples from other fields of research, such as ethnology, anthropology and environmental psychology are used to criticise and verify the findings of these two fields.

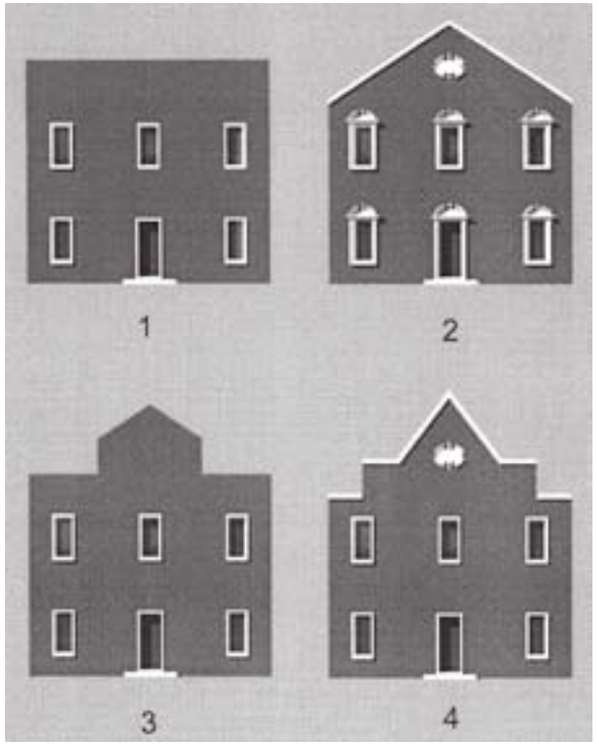
Chapter two tries to provide a translation of this theoretical knowledge of experiencing to the experiencing as it happens to everyone in everyday life. For this, Maslow's well-known theory of motivation is converted into a theory of experiencing. With this new theory of experiencing, an attempt at a general theory of architectural experience is constructed in which architectural elements such as scale, material, light, etcetera each have a specific role in the assemblage of the total experience.

Frame and further research possibilities

This research has been limited in scope and depth for reasons of limited time, as the graduation program of the Faculty of Architecture allows for just 5 months of combined research and writing. As such this research did not investigate, except for the five case studies in the appendix, specific buildings and environments and their effect on experience. This might however be an interesting topic for further research, as it allows designers to work with, change and mould these designs and experiences into their own new plans. Preliminary attempts at this have been made in for example Moussavi's books "The Function of Form" and "The Function of Ornament".[1]

Also, this research did not go into cognitive psychology and its theories of perception nor did it go into perceptual ecology and its naive realism as advocated by James J. Gibson. Further research into these fields might prove valuable.

In the field of philosophy this research was limited to naturalism and phenomenology, which were most related to behaviourism and Gestalt theory respectively. However, further research into aesthetics, such as the writings of for example Burke, Kant, Hegel, Simmel and Heidegger's notion of "dwelling", will certainly add new interesting dimensions to the discussion.



Findings

It would of course been fantastic to conclude this research with a list of architectural elements and their corresponding experiential effect on people, such as for example how people experience a certain coloured room. However, as the research progressed, it became clear that this was not possible. Only very general effects of environments on experience and behaviour can be found, such as for example that people in general like facades with more detail better than a plain undifferentiated surface.[2] Simply putting prescriptions from environmental psychology together does not yet evoke an actual experience. This research has thus tried to find a more general, holistic theory of experience that explains how it is related to every element of architecture.

As the research progressed it became clear that the results of the behaviourists' research and Descartes' naturalistic causal theories would not lead to such a holistic theory. Skinner's theories of the relationship between the environment and behaviour did not take into account the subjective processes that play a role in the determination of behaviour and the results of his research were too specific to be implemented into a dynamic environment, such as a building that is actually used. Descartes' causal theories of perception turned out to be founded on a mysterious entity that would "whisper" the actual perception of the external object into the mind of the perceiving subject.

As a result, the focus of the research turned more towards holistic theories, such as Gestalt theory and the phenomenology of Maurice Merleau-Ponty. These explain that "things" exist of structures (Gestalts) primarily and that the level of complexity of this structure determines whether the thing is an object, a living thing or a human being. The Gestalt that things consist of is also the Gestalt that contains the essential information of perception. When one observes another thing one in fact extends one's own structure and includes the structure of the perceived into one's own. This way, there is no need to transfer signification from the object to the subject, nor does it have to be hardwired in the subject already — when one's Gestalt extends to the perceived, the signification is already embodied in one's Gestalt.

Differentiation in experience among people is explained by the differences in the Gestalt of the whole, the experiencer and the experienced, which are the result of learning processes. Learning is one of the essential functions of the hu-

Research from environmental psychology — only general conclusions can be drawn, such as that in general the more detailed facades (nr. 2) are preferred.

man Gestalt. This functionality allows for a constant restructuring of one's own structure and as such the total structure of oneself connected to an external object can change over time, allowing for more evolved perceptions of the same object.

The behaviourist conception of learning is one of conditioning. No matter what behaviour has to be learned, with the right rewards everything can be hardwired into a subject. However, later research has shown that only functional behaviour remains when the reward is taken away. In the end, one can conclude that all human behaviour is functional.

To understand which functional behaviour works in the experience of architecture (since experiencing is a kind of behaviour), Abraham Maslow's Theory of Human Motivation was transformed into a theory of architectural experience. Each of Maslow's motivational needs (the physiological needs, safety needs, love needs, esteem needs and the desire for self-actualisation) could be related to an aspect of spaces. For example, the safety needs make one experience the stability and structural safety of a building. But most importantly, all architectural properties and elements, the environment as a whole, relate to the desire for self-actualisation. All the needs and the corresponding architectural elements together form the method for design that this research looked for.

It is this desire for self-actualisation that makes man look for meaning in everything and therefore also in its built environment. Meaning can be embedded into designs in many ways, but the only way it becomes available to direct experience is through means of expression. It is the expression of the environment and architecture as a whole that has to be taken into account by the designer in order to afford a certain experience.

Charlie Minter
March 16th, 2012

B.F. Skinner and his Skinner box

1. Behaviourism and its questionable assumptions

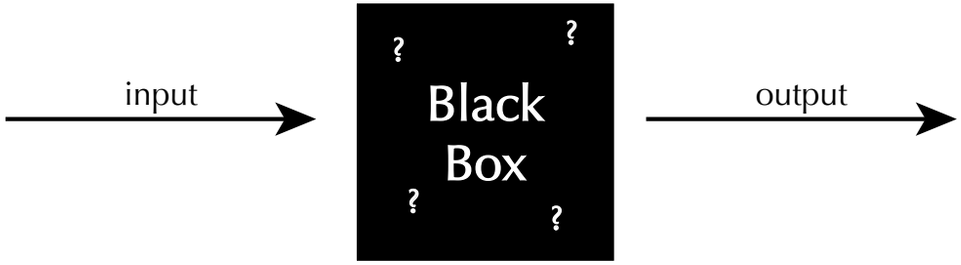
The first field of science that this research will explore to find a general theory of architectural experience is the field of behaviourism and its related fields in psychology, philosophy and art theory. Behaviourism is the science that researched the relations between behaviour and environmental conditions. Burrhus Frederic Skinner (1904 – 1990), one of the most cited psychologists of the twentieth century, was its leader.[3]

During his life, B.F. Skinner developed an impressive body of work, consisting of various inventions, a philosophy of science called 'radical behaviourism', a theory of applied behaviour analysis, theories on linguistics, reinforcement and education. Additionally, he wrote two books in which he applied his scientific findings for the sake of bettering our society. For our purpose, we will focus on Skinner's radical behaviourist theory, his theories on reinforcement (in Conditioning or Functioning) and his experiments with one of his many inventions: the Skinner Box.

Skinner developed a personal philosophy of science that he called radical behaviourism, which is at the core of all of his other work. Radical behaviourism stated that all psychological research should focus on behaviour (anything that an organism does) instead of streams of consciousness or the unconscious as was usual at the time.[4] According to Skinner, this focus of behaviour was important because "behaviour is not simply the result of more fundamental activities, to which our research must therefore be addressed, but an end in itself".[5] Consequently, radical behaviourism included cognitions (emotions, thoughts) in its definition of behaviour under "covert behaviour", as opposed to "overt behaviour", which comprised all behaviour that could be observed by two or more people.[6]

Even though radical behaviourism regards cognitions capable of causing other covert and overt behaviour, they would always remain a transition. In other words, Skinner argued that if situation A causes cognition B which in turn causes overt behaviour C, one is scientifically permitted to bypass cognition B and draw the conclusion that situation A causes behaviour C, with cognition B as a byproduct.[7]

Skinner thus regarded the human mind as a 'black box', whose internal characteristics were not open to inspection and could only be induced by looking at



its reactions to certain known stimuli.[8] Through knowing a wide range of stimuli and their corresponding observable reactions one could unravel the mysteries of the mind and know its internal functioning.

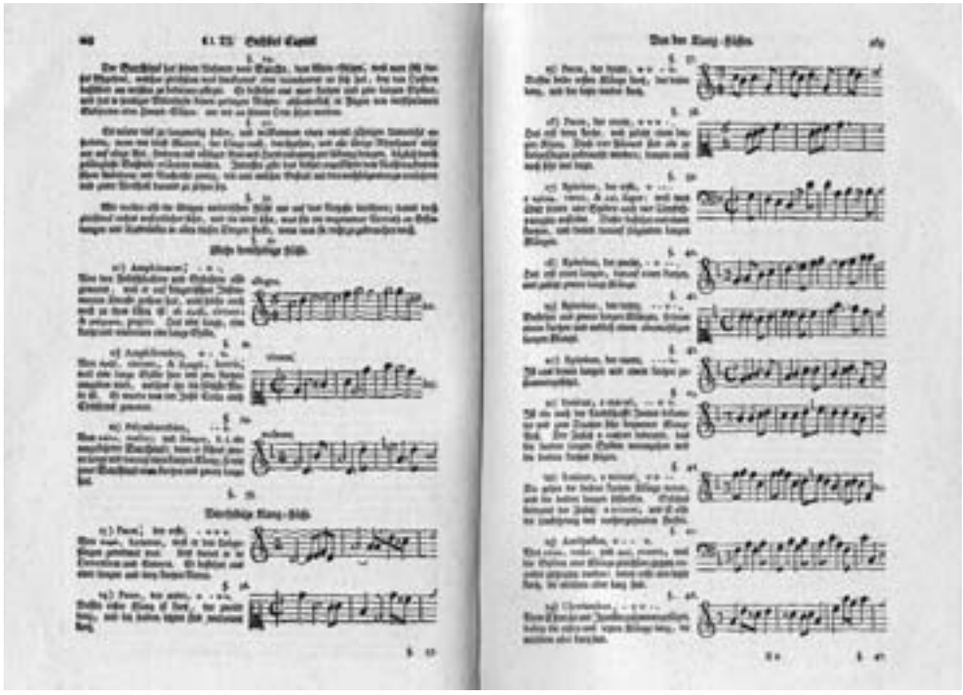
This was also the way Skinner set up his experiments — he was not so much interested in what the subject experienced inside, but more so in the overt behaviour that occurred synchronously with certain environmental conditions. Skinner argued that this was the most effective way for science to attain knowledge of the environments effect on behaviour and therefore the one that would produce the most useful results for changing society for the better.[9]

In order to find out more about certain environments and their influence on behaviour, Skinner developed the operant chamber or what is better known as the 'Skinner Box'. The operant chamber was a small box with a couple of elements that could be operated by the test subject that was put inside, so as to monitor the (changes in) behaviour of the subject. The box provided a closed and static environment so that the variables of the environment could be manipulated one by one in order to see how they influenced the behaviour of the test subject. When a certain manipulation of the environment, such as a green light that switched on, coincided with a specific kind of behaviour, Skinner called it a 'discriminative stimulus'.[10]

Skinner mostly used rats and pigeons as subjects for his experiments, for ethical and practical reasons. Only sometimes did he try to validate his findings on human subjects, with generally approving results. To account for individual differences between humans and their behaviour, Skinner chose his test subjects to be maximally different from one another. When they demonstrated the same reaction, Skinner considered his discriminative stimulus scientifically proven.[11]

Skinner was not alone in his attempt to create maps of behavioural responses to certain stimuli. Already in the seventeenth century the French philosopher Descartes (1596 - 1650) had attempted to describe the connection between the experience of "passions" and environmental influences in his Les Passions de l'âme, the Passions of the Soul.[12] Passions can be thought of as what we currently think of as emotions, but with the notable difference that Descartes' passions were considered to be a direct result of an external event, whereas we usually think of emotions as a more internal event. Descartes thought that

Top: Schematic explanation of the black box principle
Bottom: A rat operating a lever inside a Skinner box



these passions were “caused, maintained and strengthened” by what he called the “animal spirits”, which function very similar to what we would nowadays consider the function of the pulses in the nervous system.[13] The passions these animal spirits caused were perceptions or sensations of excitations of the soul.

The soul also had a central position in Descartes’ idea of perception. It was in the soul that the external events, that were registered by the sense organs, were actually perceived and understood. The animal spirits were responsible for transferring the registered sensations to the soul.[14]

Descartes attempt at a causal connection between certain environmental conditions was taken up by eighteenth century musicologists, who developed a science into the involuntary emotional effects of certain combinations of musical notes, scales, chords and harmonies that was called the doctrine of the affections (Affektenlehre). One of the main works in this field is Der Vollkommene Capellmeister by Johann Mattheson (1739).[15] Mattheson describes how for example the emotion of joy corresponded with major intervals, and sadness was elicited by minor ones, while fury could be evoked by a combination of rough harmonies and rapid melodies. Such a catalogue of elements and their corresponding effects on emotions would be a wonderful tool to work with for the architect who also wants to influence the experience of the visitor in the same way.

But before we try to assemble such a catalogue of effects we need to know what would happen if we apply Skinner’s philosophy and research to architecture. Which requirements apply to such an architecture with predetermined experiential effect, besides including the elements that cause the intended effect?

Architecture through discriminative stimuli

As Skinner found out, just a small modification of the environment in his Box often resulted in completely different behaviour of his experimental subjects.[16] [17] From this we can conclude that a first requirement for the design of a building that causes determined behaviour, is that one has to design it in such a way that the conditions remain constant. The building should be as static as the Skinner Box, in which all environmental conditions were predetermined and remained

Sample pages from Johann Mattheson’s *Der vollkommene Capellmeister*

The junction of two axes in Daniel Libeskind's Jewish Museum in empty and crowded situations

the same, except for the discriminative stimuli that were used in the experiment.

For a space in a building to remain constant, it would be required to be lighted by artificial light since any windows that let light in from outside would ruin the controlled environment — we would be able to see the weather, the time of day[18] and possibly what is going on outside, which could considerably influence the behaviour of the people in the space.

A second requirement would be that one can only enter the space alone, that is, no other people should be present in the space as they would become part of the environment and thus influence the experience of the subject. It is easy to recognise that the amount of people in a space influences our experience of it when we consider the difference between an empty train station and a crowded rush hour version of that same station. Most probably in this scenario, all kinds of intraspecies communication alter our experience of the place.[19] Because we are able to extract so much more information on threats and opportunities from our intraspecies communication, the presence of others greatly decreases the experiential influence of the space where we are in. In fact, we treat the space and the other human beings as one environment, where our perception through all our senses of the other human beings determines our experience of the environment as a whole for a larger part than the space does.

So clearly, to be able to build something that has a predetermined behavioural and experiential effect, it has to be absolutely static and devoid of life.

Whereas these two requirements for the designing of something with a predetermined experience are problematic for functionality but still feasible, a third requirement poses a real problem. The problem is that the person who experiences the environment with the discriminative stimuli is in the nature of things part of the environment. Consequently, the subject's own behaviour, both overt and covert, up to the point of the stimulus play a role in the determination of the behaviour that follows after the stimulus. A man that has grown tall will perceive environments differently than a short guy. Equally well, a man that runs through the space has a different perception than a man that stands still, and both will react to their environment differently. This past and current overt behaviour of the experiencer will radically influence the behaviour that follows.

It is not only overt behaviour that alters the experience of the environment and reactions to it, also covert behaviour plays a role: consider the experiment

Rembrandt's depiction of the Good Samaritan, who delivers the wounded traveller at an inn

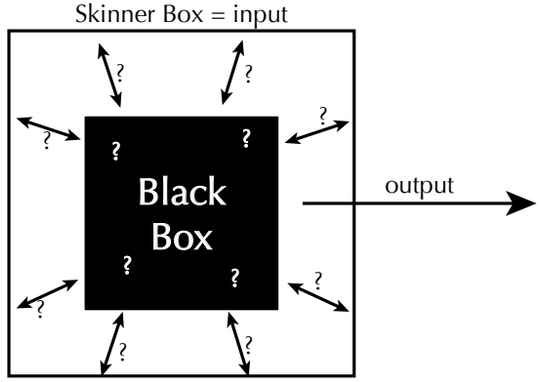
by Princeton psychologists John Darley and Daniel Batson with theology students.[20] The experiment was set up to determine whether or not the reading of the parable of the Good Samaritan — the story of Jesus in which a Samaritan helps a robbed and wounded traveller that he finds, only after the wounded traveller has been ignored by several passersby of his own faith — would influence the students own behaviour. The students were asked to prepare a short presentation on a certain story in the bible, that would take place in another room than the one where they prepared themselves. On the way from the preparation room to the lecture, they would cross a man that had collapsed in the middle of the hallway, coughing and groaning, just like in the parable. The question was, who would react and how?

The researcher introduced three variables into the experiment. Firstly, they asked the students to complete a questionnaire in which they were asked on their motivation for choosing theology as a study. Were they looking for personal or spiritual fulfilment, or did they hope to find something that would add a sense of meaning to their life?

Secondly, the themes of the students' presentations varied — some had to present the parable of the Good Samaritan, while others had to talk about the meaning of professional clerics for religious vocation.

Thirdly, the students were sent to the lecture room with two different messages. One group was told that they had to deliver their presentation in a couple of minutes, so now would be the good time to pack their stuff and go there, while the other group was told they had to hurry up because the audience was already waiting for them. Ironically, it was this last variable that correlated with the students behaviour when they encountered the collapsed man in the hallway, and not their intentions of studying theology nor the theme of the presentation that they had prepared. Almost two-third of the students that were told that they had to deliver their presentation in a little while stopped to take care of the man, while ninety percent of the students that were in a hurry paid no attention to the victim. One student, hurrying to deliver his presentation on the Good Samaritan, literally stepped over the man as to quickly continue his way to the lecture room.[21]

From this it becomes clear that certain covert behaviour, in this case having the feeling of being late, can influence the reaction to a new situation. Clearly,



some elements were not taken in with the setup of Skinner's experiments. Why wouldn't the students just react all the same and help the man in need?

To explain why Skinner's experiments and behaviourism in general can not explain these individual differences we have to look at the behaviourists conception between the environment and the subject. With Skinner's conception of the human mind as a black box is nothing wrong, but his experiments with his operant chamber in fact add another black box to the experiment. Where Skinner assumes that the variables in the environment act on the subject and trigger something in its black box that determines its resulting behaviour, there is no evidence that the relation between the environment and the subject is one of causality. In fact, because the subject is regarded as a black box of whose functions nothing is known, the relation between the subject and the environment, their mode of interaction, is unknown and therefore Skinner unintendedly introduced another black box around the first black box. The result is that the experiments involve a black box inside another black box inside Skinner's operant chamber — experiments from whose results no conclusions could be drawn, since they involve an equation with two unknowns.[22] Clearly, the theology students being late or not influences their mode of interaction with the environment. Someone who visits Gaudí's beautiful Parc Güell with the intention of hurriedly delivering supplies for the restaurant and someone who visits with the intention of enjoying his stay there will have radically different experiences of the place, even though they sense the same.

Atomism or Holism

To understand why the relation in perception between the environment and the subject isn't necessarily one of monodirectional causality and allows for differentiation between individuals, we will critically examine Descartes' conception of perception as he explained it in his Dioptrics, Man and Passions of the Soul. At first, Descartes dismissed the notion of 'simulacra', in custom since Epicurus — a kind of little images that transfer from the object to the subject that carry them the actual meaning and sensible appearance of the object.[23] Descartes instead argued that the soul had no eyes to see these pictures with, and therefore the soul itself, more or less united with the body, had to be the receiver on which the movement of light worked to cause the appearance of a

Top: Schematic explanation of Skinner's experimental setup
Bottom: Antoni Gaudí's Parc Güell

perception — just like the animal spirits could cause the passions of the soul.

But then, how are these images constituted? Why does the inner 'image' of an object resemble that object from which the movement of light is reflected? Why do we even perceive the thing as an object and not as an infinite amount of sensations? If certain combinations of stimulations of the soul are able to cause the association with a certain image in the soul, there needs to be some kind of image already inside the soul. And since Descartes regarded the soul as a part of the body — it took seat in what we nowadays know as the pineal gland — this pre-existent image in the soul has to be physiological reality.[24] But this poses a problem. To have a physiological pathway for every set of sensations of every possible angle of perspective of a certain object that connects the sensed to the correct interpretation would require an infinite amount of neurones, synapses and axons in the brain, since every perspective is unique. Obviously this would not physically fit inside our bodies.

But Descartes sought the solution to this problem not in an anatomical explanation. Instead, he argued that the soul knows the situation of objects directly by an 'institution de la nature' which accounts for the causation of certain observations in the soul, 'vue', as the result of certain stimulations on the brain.[25] For the exact workings of this institution Descartes has no rational explanation. He refers to the work of Malebranche, which makes clear that the act of perceiving a thing as it is is not the work of the soul, but the work of God.[26] But then, if we think of God as a physical being, how does it accomplish this task? And if it is just an all-penetrating network, how does it work?

In many ways The Structure of Behaviour by Maurice Merleau-Ponty (1908 - 1961) can be seen as a direct critique of Descartes' conception of perception and the workings of the soul.[27] [28] Merleau-Ponty does not accept Descartes dualistic theory of body and soul in which the body would transfer stimuli to the soul where it would be interpreted, but instead integrates them into one form, one Gestalt.[29] Within this Gestalt three different orders could be discovered, which act as the building structures of not just the human being, but of all phenomena in the world. Merleau-Ponty explains all phenomena through these three orders, that is the physical order, the vital order and the human order.

The most basic order, the physical order, contains all physical structures that account for all real[30] phenomena in this world. According to Merleau-Ponty, it

Descartes' scheme of perception — sensations are transfered by the animal spirits to the drop-shaped pineal gland

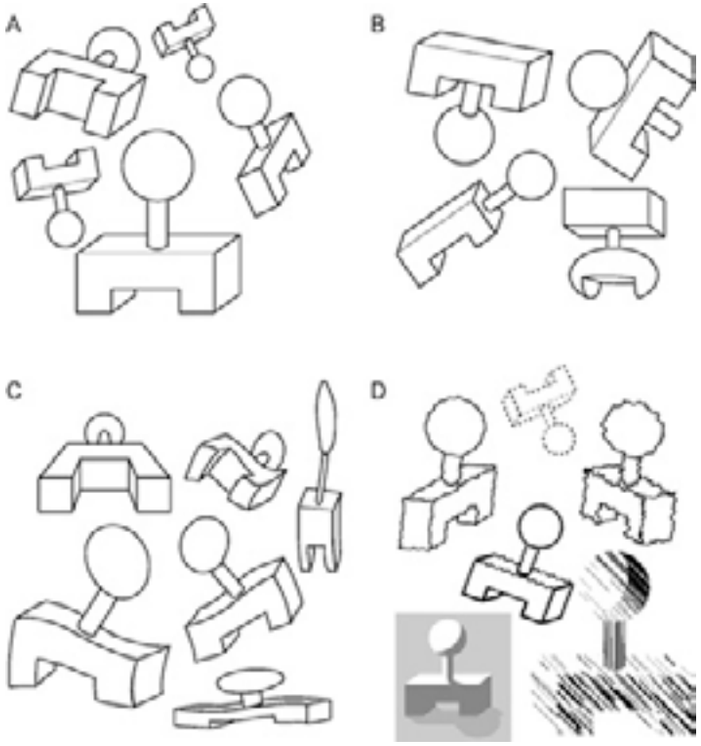
Richard Mutt's (Marcel Duchamp) fountain has a complicated cultural structure with multiple meanings. Apart from being a piece of ceramics, it is also a urinal as well as a piece of surrealist art

are not the physical laws that form the base of reality since all these physical laws are dependent on external factors. Therefore he argues that it are not the physical laws that constitute the real but the physical structures that underly the physical laws and explain their dependencies that do. The physical laws are just the appearance of these structures.[31]

A phenomenon that includes the structures of the vital order in its Gestalt would normally be described as 'alive'. At this point, the Gestalt contains structures that enable it to adjust itself. Purely physical structures are insufficient to describe certain events of the vital structures. For example, the vital structures make one retract one's hand when it touches a hot object. At this point the subject does not seem to behave according to physical laws but according to a set of laws the subject itself brings into existence. Whereas an oil spill on water (a physical structure) would never suddenly defy gravity and dive because it sees flames and it fears its own combustion, the vital order contains structures that allow the organism to keep itself alive.[32] [33] Here it is not real conditions that explain what will happen, but virtual conditions that rise from the Gestalt itself.

The inclusion of the human order in the Gestalt is what distinguishes the human being from all other vital activity. The significance of the human order is that it offers functional structures to go beyond existing structures to create new ones.[34] By introducing a certain distance between the situation and biological functions these structures allow the human being to reflect on the situation and, to a certain extent, on itself. As such, things can take on multiple meanings. For example, if a pencil would be a new thing for me, without function and without name, the human structure would allow me to add at the same time the meaning of 'a tool to write with' and the label 'pencil' to it. As a result, the human order introduces a cultural structure which does not have a direct relation to the physical situation and the preservation of itself. It is in this order that functions such as language and the conception of Gebrauchobjekts – clothing, tables, gardens — and cultural objects such as books and musical instruments appear.[35]

As such, every "form" is constituted out of these three orders of structures which have 'vectors' that, because of the interdepencies with other objects, extend beyond what we usually think of as the object's physical limits. It is through this fact that one cannot regard oneself as separate from one's environment. For example, I cannot see myself as separate from the atmosphere around



According to the Gestalt theorists, it is because of the Gestalt of an object that we perceive picture A, C and D as depictions of the same object, even though the sensations are very different

me because I am dependent of it — I depend on its temperature and oxygen and therefore my structure integrates with that of the atmosphere. Without an atmosphere, my structure would be different and without me, the atmosphere's structure would be different as well.

So where Merleau-Ponty discredits the notion of the separated body and mind because they are made of the same structures and are an integrated form, he also does away with the notion of subject and object. Subject and object become one because they stem from the same structures. And when subject and object are one, the essence of the object does not have to be transferred by means of causal action nor does it have to be physiologically hardwired in the perceiver, but it can be grasped from the unity.[36] When one perceives, Merleau-Ponty says, "the form [of the perceived] also makes up a part of the psychological individual, or rather is related to it". In the experience of the perceived "the signification is embodied".[37] [38]

Conditioning or functioning

But if signification is embodied, how can one explain the difference in experience? Why is it that a certain piece of art might not make sense to me at all, while it brings my friend to joyful tears? Why is it that I might not understand a script while a Korean does, even though its signification is embodied? Certainly not all meaning is embodied in the thing itself, and it requires learning to acquire a certain skill, taste or understanding.

If we look at the behaviourists again and their conception of the acquisition of new behaviour we see that Skinner, in his effort to change society for the better, developed methods to change the reaction of organisms to a certain stimulus. Skinner found that this could be done best through reinforcement with for example food, water, visual stimulations or sound. He distinguished four types of reinforcement: positive reinforcement, positive punishment, negative reinforcement and negative punishment. Positive reinforcement reinforces certain behaviour through the addition of something, for example sweets, whereas negative reinforcement reinforces certain behaviour through the subtraction of something unpleasurable, for example cessation of a harsh sound. Positive punishment on the other hand reinforces behaviour through the addition of something unpleasurable, such as an electric shock, whereas negative punishment

Scene from Stanley Kubrick's *A Clockwork Orange*, in which the main character is conditioned to extreme nausea when he thinks about violence or sex

would take place though the subtraction of something pleasurable after certain behaviour, such as the withdrawal of food or water. Skinner argued that reinforcement offered an alternative to punishment in our society that had much less side-effects than the punishment measures that our society uses for unwanted behaviour, such as prison and violence.[39]

Skinner's method is one of conditioning, of hardwiring certain types of behaviour with a kind of punishment or reward. But just as in A Clockwork Orange, where the criminal main character is conditioned to extreme nausea whenever he thinks about or acts out violent or sexual behaviour, over time the strength of the conditioning decreases, allowing him to act out his intentions that give him his kicks.[40] Conditioning is able to only temporarily rule out functional patterns of behaviour.

Also Pavlov's dog, submitted to one of Pavlov's conditioning experiments, started exhibiting deviating behaviour after it was exposed to a stimulus it was conditioned to for some time. It started to act out wild unconditioned behaviour (gnawing, continuous salivation, scratching) the more of the stimuli were sent at him. In the end it refused any new experience by reacting with this wild behaviour to every kind of stimulus. Pavlov himself attributed the initial unconditioned behaviour to the freedom reflex — according to which the dog reacted to the stimulus with a reaction that would liberate him of the stimulus — but in fact the dog did not react to just the conditioned stimulus, but to any kind of stimulus. It seems thus that his behaviour is not one of conditioning, but one with a biological functionality.[41]

It shows again that a one-way causal relationship between an environment and a subject cannot explain behaviour over time. Instead, it is in the end functionality that determines which behaviour (skill, taste or understanding) is acquired for a longer period. If the behaviour does not have meaning for the existing structure, it will at most be temporarily acquired.[42]

The same applies for learning something new. A child does not learn his mother tongue because its parents will like it — although this might stimulate the process — but because there is already a structure within the child for which the acquisition of speech makes functional sense. In the case of learning a language it is clearly a structure of the human order which allows the child a certain distance to the situation in order to let an object enter into a new structural relationship with a certain coordination of the diaphragm and the larynx. It is

this human functionality of going beyond structures and letting them join in new structural relationships that allows for the accumulation of knowledge and the creation of culture.

Also in the case of the art piece, knowing more about it will help starting to make sense of the embodied structure of the art piece that one connects to. In that sense, the experience is a very covert and personal issue. The complete essence, the complete signification is in the structure of the object and without any prior knowledge or skill I am still able to grasp that signification. But in order to make sense of it I need to have developed certain structures allowing me to "access" the meaning of the signification.[43]

So is there really no possibility for a "Vollkommene Capellmeister of Architecture"? Is it not true that there are certain elements that are related to certain emotional dispositions, for example colours?

There is indeed statistical evidence from the field of colour psychology that certain colours can bring about certain emotions. For example in one experiment, when the interior surfaces of prisons were painted a certain shade of orange, the prisoners tended to become more violent, but when those same surfaces were painted a specific shade of pink, it had a calming effect on the prisoners.[44] One of the researchers attributed this calming effect of pink to its tranquillising properties: "Even if a person tries to be angry or aggressive in the presence of pink, he can't. The heart muscles can't race fast enough. It's a tranquillising colour that saps your energy." [45]

However, later research showed again that the effects are limited in time and dependent on the situation. Pink prisons only have a tranquillising effect for about three months, after which the body of the inmate returns to a state of equilibrium and an equal amount of or even more incidences of aggression are measured compared to the situation before the colour change.[46] Also the size of the room turned out to be of importance — whereas the bigger rooms painted pink did have the initial calming effect, similar experiments conducted in smaller rooms reported no effect at all. Additionally, the way of lighting the room also influenced the effect of the colour.[47]

As such, it seems that a colour or another element can indeed have an emotional effect on people, but to bring about this effect it is very much dependent on other factors. These factors can be external, such as the size of the room or

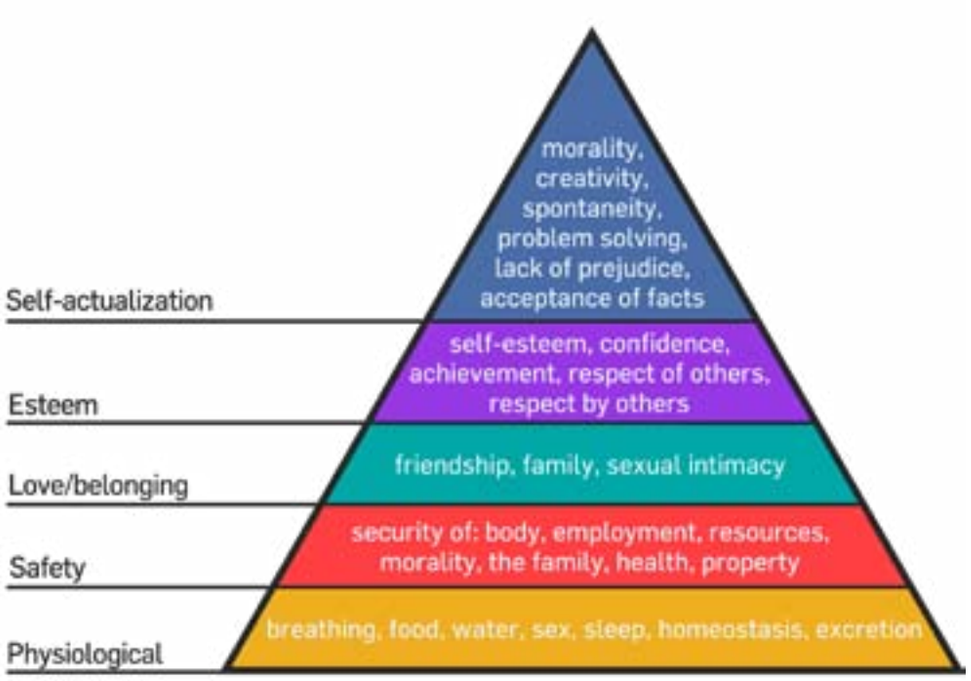
One of the prisons in the USA where a specific shade of pink called "Baker-Miller pink" was applied to reduce aggresivity among the inmates

Pavlov's dog with Pavlov's research team: can we really expect useful results in such an artifical experimental setup?

the type of lighting used, but can also be internal — whereas orange is supposed to make inmates aggressive, I have been living in a room with an orange painted wall for the last two years and can only conclude that I experienced zero incidences of aggression, most probably because I am not so much predisposed towards aggression and because I know that I am not held captive.

We can thus conclude that a "Vollkommene Capellmeister of Architecture", which would describe environmental elements and their emotional effect, is possible, but that again — as with the behaviourist's discriminative stimuli — the effect of the element depends on the situation it is in. Additionally, the amount of time a subject that is to be affected spends with the element influences the effect — one of our functional structures makes us get used to the situations we are in, it restores the equilibrium, which again changes our experience of a place. It shows again, after 'A Clockwork Orange' and Pavlov's dog, that functionality is a better determinator of behaviour and experience than separate stimuli.

So what are the functional structures that determine our experience of architecture?



2. A Theory of Experience

To find out what structural functions comprise our experience of our environment and why we think our environment matters so much, I will try to apply A. H. Maslow's Theory of Human Motivation to our experience of our environment. Throughout this application, significant personal experiences of architectural environments[A] will clarify and illustrate the way architecture and our experience are related. In doing so, an attempt at the constructing of a method for working with architectural experience is made. This method is still preliminary but through a reiterative process of using the method and making the changes needed, its accuracy will improve over time.

Abraham Harold Maslow (1908 – 1970)[48] was an American psychologist who argued that psychologists should try more to research those individuals of exceptional self-actualisation. With this he meant individuals that exhibit a very high level of fulfilledness in terms of acceptance, spontaneity, problem-centering capabilities, greater richness of emotional reaction, etc.[49] This way, psychologists would find out more about how human beings ought to work and about how less fulfilled persons that exhibit all kinds of pathological behaviour could be helped. His own research on highly self-actualised persons, for which Maslow consulted people like Albert Einstein and Eleanor Roosevelt, resulted in his Theory of Human Motivation. This theory consists of a hierarchy of needs that are the motivational factors from which the behaviour of people originates. Highly self-actualised people like Einstein and Roosevelt exhibited high levels of fulfilment, whereas less actualised people had one or more needs unfulfilled.[50]

The Theory of Human Motivation consists of a pyramid of five layers, in descending order called Self-actualisation, Esteem, Love, Safety and Physiological needs. The pyramid can only be built from the bottom, so according to Maslow a human being will first seek to more or less fulfil his physiological needs, such as food and water, before he begins to care about his safety needs.[51] Then, the safety needs will have to be fulfilled up to a certain level before one starts looking for love and belonging, and subsequently esteem. If all these needs are completed, one's motivational state moves on to the tip of the pyramid — self-actualisation.[52] It is at this level that the motivational drive shifts from needing and wanting to a less clinging sort of desire, from deficiency to growth.[53] In a later revision of his hierarchy of needs, Maslow further specified the pyramid's

[A] Full descriptions can be found in the appendix

Maslow's pyramid of the Hierarchy of Needs

tip of self-actualisation. It is itself again divided into four layers, starting at the bottom with the cognitive desires (the desires to know, understand, explore), the aesthetic desires (desire for beauty, symmetry), the desire for self-actualisation (realisation of one's potential) and at the very top self-transcendence, which is the state in which one connects to something beyond the ego.[54]

We will try to apply Maslow's hierarchy of needs to our experience of our environment and architecture specifically, to see how it fits to the way we experience this. After all, experiencing is a form of covert behaviour.

Each need in the hierarchy here represents a function or a set of functions from the vital or the human order for experiencing as conceived in the previous chapter. Just like the different functions in the physical, vital and human order integrate into one whole, Maslow's needs should not be regarded as a hierarchy of functions of experience, but as a synchronous whole.[55]

Starting at the bottom with the physiological layer, it seems that architecture plays a rather limited role in this layer — it can neither provide man with food nor with water nor with sex, the demands that Maslow attributed to the primary layer of needs.[56] However, there is one vital function, respiration, that searches for a supply of oxygen. It rarely happens, but in essence it is possible that a building deprives one of oxygen completely, which will result in suffocation and death eventually.

What does happen, especially in more recent buildings that are sealed off from the exterior except for a closed system of mechanical air supply, is that the levels of oxygen decrease in crowded places, while temperature and the agglomeration of other chemical pollutants that interfere with the endocrine system increase due to insufficient ventilation. This often results in all kinds of symptoms that are joined in what is called Sick Building Syndrome: nausea, lightheadedness, inability to concentrate, allergies, asthma, irritations to the eye, nose and respiratory system, fatigue, headaches and nervous-system disorders. For the people who live in these buildings, these symptoms obviously become part of their experience of the building, especially because the symptoms often disappear and reappear upon leaving and reentering the building. The conditions inside the building frustrate their vital structures.[57]

The second layer, that of safety, is very applicable to our experience of the environment in general and the built environment specifically. It is more concerned with the matter of the building than the conditions that it creates.

Safety is, of course, next to proper nutrition of primary importance for a vital structure. And since our species' primary interest is survival and thus the primary action is making sure that we survive, we constantly examine our environment for safety. Similarly to the active functional conception that Gestalt theory and Merleau-Ponty gives us, Hall explains in The Hidden Dimension that man's perception of space and the environment is related to action, and because of the ever-changing quality of action man's perception is dynamic.[58] This means that man and his senses are not passive, but that man actively searches for certain sensations that have a logical relation to the action that man wants to undertake. This is one of our fundamental vital functions that we share with many other organisms too — for example the birds that constantly check their environment for possible danger and fly away when one approaches them.

Whenever we enter a room, our eyes make a quick scan along all surfaces and corners to see whether or not the space is safe to enter. We do not feel comfortable in a place when we haven't been able to do this check, for example when we enter a place while we are in a conversation that does not allow our eyes to wander off. But also other senses are involved in this scanning process — whenever we hear something cracking we are alarmed, whenever we feel that a floor moves too much under weight we step back and even the smell, as Hall argues, of a distressed human being warns us for potential danger.[59] These senses combined let us decide whether or not we think a place is safe.

Not only do we scan the spaces around us in our struggle to survive, we also look for possible threats when looking at other people and animals. We use our distance senses — our eyes, ears, and smell — to judge people at a distance on whether or not they are threat to us. Only after we decide that they aren't, we let them enter into our more personal territories.

Whereas the two lower layers of Maslow's hierarchy determine whether or not we consider a building safe to enter or be around, the higher layers of his pyramid can be applied to experience in order to understand the architectural experience in terms of beauty, of comfort and connectedness.

Starting with the need for love and belonging, we could apply this to our

The seemingly unsafe cantilevers on MVRDV's WoZoCo building make one aware of one's functional structures that check for safety

environment in terms of scale and distance. As Hall explains, all organisms, including man, extend beyond their physical form through territoriality. Man has four kinds of territories, and each of these territories has a different function. The most outer territory is called the public territory and ranges up to approximately twenty-five feet (7,62 meters). The exact radius of the territory can vary with the level of dominance. When someone enters into someone else's public extension, the person will be judged for safety. If a person considers the one entering the territory as a threat, he or she has time either to prepare for fighting or to start the flight. However if the person considers the other as safe, they can cohabitate the space peacefully and might even approach closer towards the social territory.

The social territory ranges from approximately four to twelve feet (1,2 to 3,6 meters). The social territory is used for communication through speech, where the outer ranges correspond to the more formal communication and the inner ranges more to the communication that you have with friends.

Once we get closer, we enter into the personal territory that ranges from one-and-a-half to four feet (0,46 - 1,2 meters). This is the territory that we try to avoid being in unless we can really appreciate the other person, since at this distance we cannot only see and hear the other person, but also feel and smell. Especially the latter has the ability to mess with our own endocrine system, so we prefer to keep people out that do not want to perceive so directly.

At even closer distances we enter intimate space, where we usually only let people enter to who we have a very intimate relationship. At this distance the olfactory, touch and auditive senses take over the leading role of the visual, since at a distance this close it is hard to focus.[60]

These different territories and distances relate well to the experiences we have of our non-human environment too. In other words, distance relates to the level of intimacy we perceive. As such, our houses have evolved into relatively small spaces and we feel therefore more at home in the more intimate spaces. That might also explain why people feel like they belong to God much more when they are in one of Borromini's small white chapels, such as the S. Carlo alle Quatro Fontane and the S. Ivo alla Sapienza, than in the Saint Peter's Basilica, where one feels like God is infinitely larger than you are and as such you can not belong to him. Similarly, Zumthor's Bruder Klaus chapel felt for me like a very personal meditative space because of its size.[B]

[B] See appendix

Top: Borromini's S. Ivo alla Sapienza

Bottom: Saint Peter's Basilica

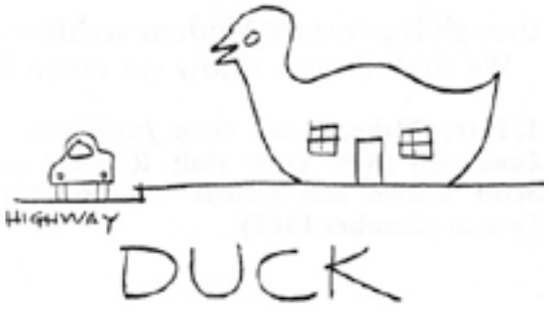
If you would however for some reason not like the interior or the smell of burnt wood, this small intimate distance can also evoke vehement rejection. The narrow spaces between the stelae in Eisenman's Holocaust Memorial in Berlin create a artificial intimacy between the visitor and the surfaces of the stelae, which, cold, grey and uniform as they are, in me evoked feelings of disgust and tightness because I did not want to belong to these surfaces.[C] Clearly, functions of the human order play a role here — I liked Zumthor's small space because its location in nature, the smell of burnt wood and its round space where light entered from the centre reminded me of evenings where I used to sit around campfires with my friends, which made me feel great. On the other hand, I felt oppressed in the Holocaust Memorial because of the associations I had with the stelae — for me their gradual increase in height when I walked into the monument represented the increasing number of corpses of the victims, stacked higher and higher the deeper I looked into the tragedy. But for some children, who did not have the knowledge of the horrors of the Holocaust or at least whose structure did not "access" this signification of the monument, the stelae did not carry this meaning — for them it were just stepping stones.

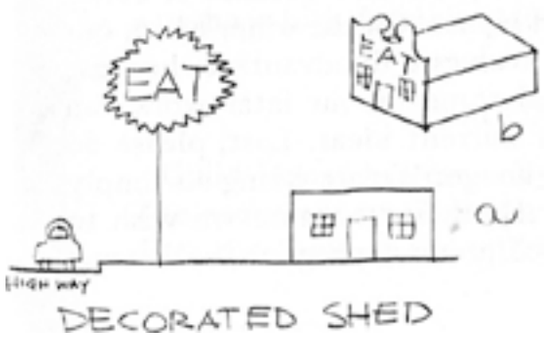
On the other hand, larger spaces and a larger scale, while not so much capable of fulfilling the love and belonging needs, are generally more tolerant, more public, in the sense that they can be easily ignored. Many people do not even notice and concentrate on their own business when they walk through a beautiful railway station, just because the scale of the space and the distances towards its surfaces are too big.

Hall even argues that scale is the single most important element to be considered by the urban planner and the architect, because it is the determining factor of whether or not people like their environment. A complicating factor for our mixed cities is that it is hard to find a scale that suits everyone's needs, because the proxemic distances were structured differently among members of the many different cultures and subcultures that make up our cities.[61] [62]

The last of the layers that is driven by a wanting motivation is the layer of Esteem. Maslow describes this as the need for strength and achievement, confidence, independence and freedom and additionally recognition, appreciation and prestige.[63] When this need is satisfied, one feels capable and confident of being useful and necessary. It as such sets the final condition necessary before

[C] See appendix





one can move on to the motivations of growth, self-actualisation.

In architecture one can distinguish qualities of the experience that allow for the same freedom and confidence for the further development of the individual. Again architectural scale plays a role, but so do comfort and convenience. A scale that is too large, such as in the example of the Saint Peter's above, may give the visitor the experience of being futile. Correspondingly, a scale that is too small can give the sense of being held captive, of not being free. In Dutch there is an expression which can be translated with "the walls come towards me" that one uses when one (unconsciously) feels as if external conditions limit one in the development of one's potentialities. [64] Literally, a space too small can make one feel inhibited, such as Hall explains with the results of his research to Arab immigrants in the United States — being used to wide spaces, high ceilings and unobstructed views in their country of origin, they get depressed as soon as they move into small apartments with high-rise blocks that block the view on both sides.[65]

Additionally, the convenience and comfort that a building or environment offers is essential for the experience of esteem. A building that provides enough (day)light and fresh air, the correct humidity and temperature creates the physical conditions that allow one to continue to work on self-actualisation, on becoming what one can be. It provides the necessary freedom of constraining factors which might otherwise interfere with one's self-actualisation process.

Buildings that satisfy the above four needs, that is, they provide oxygen, they are safe to be in and around, they have a certain scale adequate to the people inside and the purpose of the building and they provide the right lighting and climate conditions inside, can be said to be functional. Such a building will be sufficient for us to live in and can provide the necessary satisfaction of the basic four needs of Maslow's hierarchy as far as buildings can provide this. In fact, many of the contemporary dwellings provide exactly these conditions — they are just boxes with more or less the right sizes to live in, just like Robert Venturi, Steven Izenour and Denise Scott Brown advocated in their famous manifesto Learning from Las Vegas.[66]

However, as soon as we start to live in one of these boxes, we put carpet on the bare floors, paint the walls in different colours and add objects that have a meaning for us. We add objects that have a functional meaning to us, such as a

Contemporary dwellings are like decorated sheds as opposed to "ducks". They provide a functional box that inhabitants can add meaning to by painting the walls and adding objects.

The Architect, by his arrangement of forms, realizes an order which is a pure creation of his spirit; by forms and shapes he affects our senses to an acute degree, and provokes plastic emotions; by the relationships which he creates he wakes in us profound echoes, he gives us the measure of an order which we feel to be in accordance with that of our world, he determines the various movements of our heart and of our understanding; it is then that we experience the sense of beauty.

stove, a monitor, a vacuum cleaner. Additionally we, more or less consciously, add elements that have a certain symbolic meaning to us — we paint the wall in a colour that has meaning to us, we keep pictures of people and events that have meaning to us, we put the books that have a meaning to us in the bookcase and we choose the furniture (and even stoves, monitors and vacuum cleaners) that we think are beautiful. Also conditions such as smell and temperature can carry a meaning.[67] It are these elements that we add to our boxes that lift the experience of our houses to the next level of self-actualisation. Because through these elements that convey meaning for us, that are the symbolic expressions of the abstract meaning of certain phenomena, we try to make our houses into something we experience as beautiful, which is the highest level of self-actualisation possible for the experience.

Whereas the previous example deals with how we make the boxes of our houses into spaces that we experience as beautiful, also the building itself can be designed as a combination of spaces and volumes that contain a certain symbolic meaning. However, the meaning itself and the transferring of the meaning both rely on methods of expression. The right expression that is understood by the visitor of the space and a correspondence between the expressed and the beliefs of the visitor will ultimately result in the experience of beautiful architecture.

Conclusion

As we have seen, no proof has been found that there are individual elements, such as colour, or specific sets of elements, such as a coloured prison cell with specific dimensions, that can trigger the same experience in everyone. And if it can, as in the case of the conditioned stimulus, it only works for a short amount of time. Architecture, or any external object in general, is unable to trigger something specifically predetermined inside all of us — not an image, not a word and not an emotion. A such, we cannot think of a list of architectural elements and their corresponding effect on experience.

Also rationally and reductively, the way a certain set of sensations, such as the light that reflects from a book, would be linked to a specific experience, remains a mystery. Descartes theory that would allow an object to trigger something inside the subject ultimately leads us to either an infinite amount of brains to

Le Corbusier's explanation of the experience of beauty. An accordance between the expressed and the beliefs of the visitor results in the experience of beauty

have distinct connections for every possible combination of sensations, or the idea of God who would take care of the perceptions and emotion caused inside us. Both explanations do not provide a scientific base on which to found such a list of elements and experiences.

We have looked for an alternative that provides an integrated solution to the problem of perception. It can be found in Gestalt theory and the philosophy of Merleau-Ponty, who both explain sensation and perception as matter of structure. According to Merleau-Ponty, everything consists out of structures, and it is by a relation between these structures that we can sense and perceive the things as they are.

But then the problem of differences in experiences leads us to the problem of learning. Again, the behaviourists and their notion of conditioning does not seem to provide a comprehensive solution of learning. It seems that acquired behaviour, in order to be sustained, needs to be functional rather than conditioned with punishment or rewards. In fact, all structures of behaviour turn out to be based on a function.

In order to find the functions that constitute the experience of architecture, the needs of Maslow's Hierarchy are used as functions. The architectural experience is analysed and different architectural elements, such as scale, material and temperature are attributed to the different functions. Together they form the expression of the architecture.

The layers from Maslow's Hierarchy of Needs provide architects and designers in general with a tool to work with experience. This tool offers no prescriptions of certain elements that would cause a certain effect in the perceiving subject, but rather provides a means to analyse our own experiences of the environment and to assess and communicate the experiential value of design solutions. For designers it provides a means to develop a toolbox of their own experiences and a method to evaluate their own designs. Through the use of the method new functions that have a role in the experience of architecture can be added and others will disappear, which will make the tool more accurate.

However, it is the responsibility and sensitivity of the architect to select the right methods to express the idea, to choose the signs that are able to transfer his message. He has a wealth of choice, using different scales, materials, shapes, orders, temperatures, surfaces, etcetera to express his ideas and make them experienceable for others. For a large part his cultural background, that he shares with many, will determine his choices for expression. This shared cultural background, a shared structure of perception, will make sure that the meaning he puts into the objects he designs, will be understandable for many people besides just himself.

It is also the responsibility of the architect to arrange these elements in such a way that they form meaningful wholes, just like the composer has to arrange instruments and notes into melodies and harmonies, into phrases and parts which in the end form a meaningful symphony. Simply drawing them from an architectural equivalent of Der Vollkommene Capellmeister will not do — the experience of architecture comes as a whole, not in parts.

Epilogue

As was written in the introduction, this research comprises the first part of a graduation project. The second part consists of a design project for the redesign of the underground U-Bahnhof on Kottbusser Tor, Berlin and its surroundings. The goal for this design project is to design an U-Bahnhof where people experience peacefulness, which will make it into a nice place to remain.

When one wants to know how to create a place where a certain experience is afforded, it is important to understand what experience is, how it works and what it is evoked by. For this reason the research has focussed on a method for working with experience. Merleau-Ponty's holistic conception of perception, which explains the complexity of perception and experience, shows that the designer has to pay attention to the design as a whole, instead of focussing on individual elements or single design aspects. On the other hand, when one starts to design, there is not immediately "a whole" that can be experienced, and so designers need tools to gradually build up a design from the bottom-up. The theory of experience that was explained in chapter two and derived from Maslow's Theory of Motivation, provides the designer with such tools. It groups certain elements of human experience together and connects it to architectural themes, such as scale, material, light, etcetera. This makes it into a practical tool when one wants to afford a certain experience with a design, such as the experience of peacefulness in this case. Throughout this epilogue examples will be shown of how this tool can be put into action.

Additionally, the introduction tells the story of the Bijlmermeer and other urban renewal projects of the sixties and the seventies, that have generally failed at creating a positive experience.The question that remains is how we can use the knowledge this research has provided to prevent future developments in architecture and urbanism from having the same devastating effect on experience as the area around Kottbusser Tor, the Bijlmermeer and the Banlieus of Paris. In other words, what requirement can we set up for future design theories so that they will not fail and how can we ameliorate the problems that have arisen in these areas using the knowledge from this research?

It is hard to answer that question, since it would require knowledge of all future developments of design theories that are bound to fail to give a definitive answer. However, we can say that any design theory is bound to fail if it does not treat an architectural object or an urban area as an organism in the Merleau-Pontian sense, that is, composed of a complicated web of vectorial relations, often extending outside its physical form, which result in a total form. In ecology, any thing that only has a one or two functions or relations with its environment will not live very long, no matter how strong those relations are — it is not the fittest that survive, but the most fitting that do. And so it is with architecture and urbanism: as soon as areas as the Bijlmermeer and the Banlieus in Paris are planned as extensions of the city with the sole purpose of providing many places to live, it will suffer the same fate as a separate piece of organism that is only glued to another organism. After a while it starts to rot.

In a purely architectural sense, the designs of the buildings in these areas as well as on Kottbusser Tor often neglect the importance of the relationship that they have with people's functions of experience, in particular those that govern belonging and meaning. The dwelling blocks in these areas are often of an enormous scale in height and length, such that, when one walks besides them, they make one feel small.

Additionally, because of the construction methods of these buildings that use prefabricated elements (e.g. Plattenbau, Indeco-Coignet), they have a repetitive appearance. Every dwelling looks exactly the same from the outside, which makes it hard for someone to have a sense of connection with any of them. After all, any form of belonging always requires a certain amount of distinction. And no matter how well composed, good and orderly the repetitions of the designs may look, their endless dull repetitiveness still carries a meaning of financial considerations that prevail over diversity, joy and individual development.

In order to ameliorate the problems in these areas, new vectorial relations have to be added to their web of form so that their total form starts to look more like the complicated web of relations of properly functioning parts of towns. This will make them into functioning organisms themselves. Most often, the measures that will need to be taken include the introduction of mixed zoning, so that places to work, to live, to recreate and to buy things can be found within the area. Additionally, the social structure of these areas often needs to be improved by increasing the differentiation. Because of the repetitive building method, most dwellings are of the same size, which attracts just one kind of family to

these areas. By increasing the variety of the supply, the social structure of these areas will be more differentiated, so that every member of this social structure can have a role ideally suited to him or her within the area.

Also on the scale of the building the web of relations can be improved. The functionalists' simplified interpretation of a building as a functional tool (in this case a place to provide shelter for families) that can be visually well composed has resulted in a superficial relationship between the object and the people. To improve it, new relationships have to be added to this web, mostly in terms of proper scale and meaning. The experience of the size of the buildings can be improved by cutting the long buildings in several parts. By introducing setbacks and additions on the lower floors (with mixed program) the experience of the height of the buildings becomes less dramatic. In terms of improving the expression, less repetitiveness and more differentiation and relation between the inhabitants and their house can be created by allowing the inhabitants to grow different kinds of plants on their balconies or use other means of individual expression on the outside of their house.

On Kottbusser Tor, the urban situation is not as bad as in the Bijlmermeer or the Banlieus, because it is located right at the heart of one of the most lively neighbourhoods of Berlin: Kreuzberg. It has a relatively well mixed supply of functions, with grocery and clothing shops, houses, cafes, restaurants, offices, many dwellings and public transportation all on one square.

However, the social structure of the area around Kottbusser Tor (80% Turkish immigrants, low income) is very unvaried. Additionally, Kottbusser Tor is so packed with traffic, enormous buildings and people that being there easily leads to sensory overload. Using the theory of experience from chapter two, we find that particularly the functions of the safety layer are working overtime — a continuous flow of signals from both the traffic and social situations ask for their interpretation of whether or not one is safe. Here it is not the quantity of the relationships that needs to be improved, but the quality.

The theory of experience also gives us some clues on how to solve these problems. Again, with a more varied supply of dwellings, a more varied population structure might be obtained. To reduce the working load on people's safety functions it would help to give some structure to the excitations. Firstly, the situation could be made much more clear-structured by reducing the amount of excita-

Kottbusser Tor is packed with traffic and enormous buildings on a relatively small surface

tions. This could be done by restructuring the car traffic on Kottbusser Tor, for example by placing much of it underground. Secondly, the impact of the excitations could be decreased by increasing the distance between the perceiver and the excitant. This could be done by increasing the amount of available space on the square. However, care must be taken that the space does not become too open, because this might lead to people feeling alienated, like they feel in the giant open spaces in the Bijlmermeer.

On the architectural level, the repetitive expression of the facades could be much improved by allowing for more individual expression of the inhabitants on the facades of their apartments, which will also improve the connection that the place where they live. Additionally, the balconies, that are so dark that they have the expression of empty lifeless eye sockets, could be livened up by letting the inhabitants grow edible plants on them. This will have the additional benefit of reducing their food costs.

The underground U-Bahnhof currently has an expression of pure functionality because its dimensions exactly fit the height and length of an U-Bahn train. As a result the ceiling of the space is very low. Together with the parallel walls and the absence of any daylight this makes one feel deprived of freedom. The harsh materials used in the U-Bahnhof and the smelly conditions make clear that this place is not intended as a place to stay.

Since the goal of the design project is to make this into an U-Bahnhof that evokes feelings of peacefulness, it is first of all important to make the place more attractive for staying (since wanting to get out is not a peaceful state of mind). This can be done by optimising the conditions for the functions of the first four layers of the theory of experience — by providing fresh air, a clear and stable construction, by using a scale and materials that people can relate to and by providing comfortable light and temperature conditions so that people feel empowered.

Secondly, the place as a whole should have an expression of peacefulness (the fifth layer of the theory of experience). For me, the experience of peacefulness consists of two abstract ideas – freedom and continuity in both time and space. Freedom because being at peace requires freedom from potential danger and restraints. And continuity in both time and space because this moment and place of freedom has to be extended in time and space to warrant this experi-

ence of peacefulness.[68] After all, one would not feel peaceful if one knows that the freedom ends in a minute or around the corner.

In practical design directives the expression of continuity in time and space means that there needs to be a continuation of the space without abrupt terminations. Freedom means first of all that the space should be comfortable, that is, free of danger and with empowering environmental conditions, which are ensured by the first four layers of the theory of experience.

Secondly, freedom means that there should be an absence of restrictive expressions in the space, such as dominant construction rhythms, walls without openings and materials that express distrust in the visitor. This way, the space itself starts to appear free. With these conditions met, the visitor will hopefully form a relationship with the space that evokes feelings of peacefulness.

Materials and elements that express distrust in the visitor, here on an abandoned shop inside U-Bahnhof Kottbusser Tor

Appendix — Architectural experiences

Neue Wache, Berlin

One of my strongest experiences of the sublime was when I first visited the Neue Wache for the first time. The experience was completely unexpected, I had no idea that I had just walked into a building by Schinkel nor did I know anything about its history. Just like Kant explained, this was an experience of two blows — the first hit me into a sort of dazzling state of awe and the second made me wake up from this state and made me wonder what had just happened, what had causesdthis experience.

When I was about to visit the Neue Wache for the second time, I was eager to find out about the role of unexpectedness in this experience of the sublime. Would I be knocked into this dazzling state of awe again also when I was prepared? To my excitement, it happened again. But what was it, what was the particular structure of this place that made this experience possible?

The Neue Wache is designed originally by Karl Friedrich Schinkel (1781 - 1841) as a guardhouse for the guards of the Prussian king.[69] After it was heavily damaged during WWI and the monarchy had transformed into a republic, architect Heinrich Tessenow (1876 - 1950) was asked to redesign the interior of the building into a monument for the fallen of the war. He introduced a large opened oculus in the roof, covered the floor with black basalt cobblestones of irregular sizes and covered the walls with rectangular regularly sized panels of light ochre travertine. Their lying orientation emphasised the width and depth of the building.[70] From the reopening in 1931 on, the building was annexed by subsequently the Nazi regime, the Soviets, the communist government of the GDR and finally the current government, each of them installing their own monument (with cultural meaning) under the oculus. Currently, there is an oversized version of Käthe Kollwitz' Mutter mit totem Sohn.

On my second visit, I noticed that a number of functions of experience were put into action when I entered. First: was this building safe? I have probably preconsciously checked for this, and this was when I noticed the tiny slit between the ceiling and the walls. This tiny division gives the expression of extreme

Käthe Kollwitz' *Mutter mit totem Sohn* in the Neue Wache

forcefulness to the walls, as if they are not just holding the ceiling but actually throwing it in the air just a little.

Then: did I feel I belonged here? Not really, the scale was a bit too big, the material a bit too solid, the weight a bit too heavy. But the panels covering the walls were more my size, I could connect to them.

Next: did this building made me feel capable, confident? Again, not really. The scale being a bit too big and the building having the same climate as outside made me feel small and did not make me feel capable of something.

But what really made the difference was the expression of the interior. The panels on the walls had a proportion similar to the proportion of the walls themselves and were applied alternatively, making it seem as if the whole was made out of many of the panels that I could connect to. But at the edges of the wall the shorter panel was connected to its neighbour, so that no high contrasts were visible near the edge of the wall. This, in combination with the central lighting from the top made that the corners of the volume appeared unclear. The result was a feeling that this wall could go on endlessly, that there were infinite amounts of panels to which I felt connected needed to make up this wall that seemed to carry the roof so lightly. And together with the white ceiling where the light came in I had the association with the idea of humility, of being just one (panel) in the infinite large amount of creatures that make up this world, which all together (the wall) make this world into a fascinating (light) place. The feeling was so strong that it dazzled me for while. Only after coming to grips with the situation, I was able to find out what had caused this experience.

Bruder Klaus chapel, Mechernich, Germany

The way towards the chapel in Mechernich seems like a 'route architecturale' meant to prepare the visitors for the experience of the Bruder Klaus chapel by Swiss architect Peter Zumthor (1943 -).[71] Starting off at the high-speed 'Autobahn', the road towards Mechernich goes through increasingly delicate Eiffel villages full of vernacular timber framed barns and houses. At the end, one arrives in a tranquil village that consists of little more than a few houses, a football pitch and, since 2007, a beautiful chapel.

Once arrived in Mechernich, one parks the car next to the local football pitch at the foot of a small hill. From there you can see the sandy coloured prismatic

The 'sfumato' of the corners of the walls create the experience of endlessness

shape that rises above the golden cornfields halfway up the hill against a backdrop of trees. A shell-path leads you to a tractor track that brings you to the Bruder Klaus chapel. One approaches the concrete tower head-on where again a small path leads you through the cornfields to the entrance of the chapel. The stainless steel entrance door of the chapel is shaped as a isosceles triangle, with its two longer sides pointing upwards, emphasising the tall elevation of the chapel. If you had not yet understood from the unconventional shape and placement of the building that you were about to enter a special place, this uncommonly shaped door with its ingenious lock mechanism will make you aware that this might be a different place than you have ever seen before.

The man to which this chapel is devoted is the 15th century Swiss mystic Nicholas of Flüe, better known as Bruder Klaus as he was called by the men that came to see him for spiritual advice. Bruder Klaus' life work was the union of God and the world ("einig wesen"). At the age of fifty he leaves his family to lead the live of a hermit and think deeply about the trouble of the world and the conditions that prevent the "einig wesen". After several rambles through nature he arrives at a town called Liestal where a peasant tells him not to go abroad, but instead serve God in his home land. Struck by lightning in a thunderstorm, Bruder Klaus decides indeed to go back. Four little lights lead him to the place where he is supposed to settle — close to his family right on the spot where he had a vision of a high tower when he was sixteen. Local peasants build him a chapel and a small house, where he can guide and support the people like a living tower.[72]

Zumthor built the tower that Bruder Klaus had seen when he was sixteen. But this time the tower was not situated in Switzerland, but its concrete shape rose out of the cornfields near the German town Mechernich. However, all of the elements of Bruder Klaus' life story have found their way into this tower, some of them more literally than others.

First of all, the chapel is clearly meant for the kind of secluded philosophical way of life that Bruder Klaus aimed for when he left his family — the interior space is small and the only bench inside provides a maximum of two places. With more than two people inside, the interior space loses its contemplative atmosphere and one actually wants to get out. The only direct references in the chapel to Bruder Klaus are a bust and a small bronze steering wheel-like figure

that represented the union of nature and God for the mystic.

The other union, that of Bruder Klaus' connection to his home land, is expressed by Zumthor use of local materials and local workmanship. The cement of the tower's construction was mixed with local red sand and poured over a formwork of 120 trees from the nearby forest by local workers.[73] The floor of the interior is made of a tin-lead alloy as Mechernich used to be a lead-mining town.[74]

The tree trunks that formed the inside of the framework have been burnt away after the concrete had set, leaving the interior stained with charcoal and the smell of burnt wood, a parallel with the burnt town of Liestal where Bruder Klaus had to turn around. The interior space is open at the top, exposing the visitor to the dangers of the weather, just like Bruder Klaus was exposed to them on his journey. The holes that were punctured through the concrete to let the smoke escape are now filled with glass bulbs and let tiny bits of light into the interior. They represent the guiding lights that helped Bruder Klaus find a place to settle.

Finally, the union that Bruder Klaus was looking for is provided by the architect through a combination of the four elements: Earth (the lead floor, the concrete), fire (the smell and charcoal of the burnt framework), water (that enters through the oculus above the interior space and forms a small pool on the floor) and light (through the oculus and the glass bulbs). Because of his usual focus on material and sensation, it is assumable that Zumthor thinks that the union of God and the world can be found using the correct combination of these four elements.[75]

When I first visited the Bruder Klaus chapel I was completely unaware of the history of Bruder Klaus. When I approached the chapel and tried to enter I noticed the heaviness of the door. The weight of the door and the thick concrete walls made me feel secluded once I was inside, and besides it worked well to close off the inside space from the animated voices of the Zumthor enthusiasts that were standing outside. From the inside, the door's shape is accentuated by a small strip of light circumscribing the door profile.

Once I was inside the centre of the chapel the round shape of the interior, the centred source of light, the tiny bits of light through the former smoke openings, the cool air inside and the scents of fire and ash reminded me of cosy campfires on starry summer evenings where I would sit around with friends and enjoy

The interior of the Bruder Klaus Chapel with the glass bulbs and Bruder Klaus's wheel-like icon

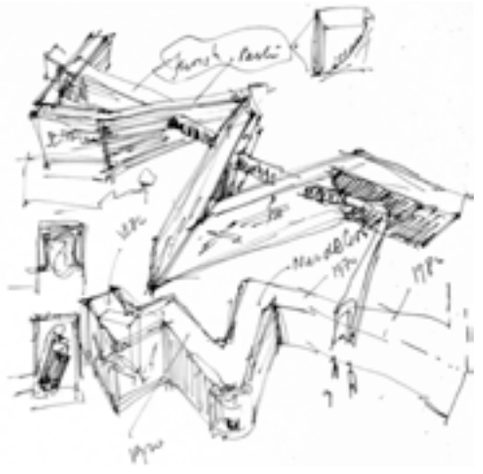
their company, the radiant heat and the colours of the flames. The cast lead -tin floor further reinforced the memory of campfires as its silvery colour resembled the leftovers of a campfire.

But even though the scale of the chapel resembled the size of the circles around a campfire, this place seemed not meant to be enjoyed with a group of people. Instead, the small wooden bench to the side of the chapel, the burning candles and the silence made clear to that this was a vessel for meditation on one's own. The cone-like space of the interior almost resembled a tipi or a tent, a kind of primordial home constructed with tree trunks with an triangular shaped entrance flap. The use of trees in the construction made me feel like my tent was placed in the middle of the forest.

Also the exterior of the chapel is designed as a place for meditation. I could look for hours at the beautiful lines, textures and colours of the exterior concrete shell of the chapel, but the architect intended something else — the prismatic shape of the chapel has a small broadening around the foot which acts as a bench that allows you to sit and enjoy the play of the wind through the corn-field's the endless variations of golds. The world's infinite depth of beauty is used as the object of contemplation here.

So even though I did not know about Bruder Klaus and his connection with nature, Zumthor succeeded in transferring most of his intentions on me. Due to the scale it became clear that I was intended to be alone in this place. And even though I perceived the glass bulbs as shining stars instead of guiding lights, the experience of being in a forest at night was indeed transferred on me due to the density, the dim light and the materials. Whereas the intention of the union of the four elements only became clear to me later, Zumthor's chapel also makes clear to the layman where to look for salvation — inside, the concentricity makes you look within, and outside the placement of the bench makes clear that one should focus on the surrounding landscape.

Clearly, Zumthor intended the Bruder Klaus chapel as a place for meditation and reflection, designed to let people find peace and compassion, just as they used to find at Bruder Klaus. The Jewish Museum however is intended to make people feel scared and remind them of the horrors of the Jewish history.



Jewish Museum, Berlin

In the summer of 2007 I made my first visit to the Jewish Museum by Daniel Libeskind (1946 -)in Berlin.[76] Friends and family had told me about the various experiences they had when they visited the building — some of them had found it just interesting but others had experienced more profound emotional effects. Thrilled by the many stories of their experiences, I had high expectations of the effects that this building would have on my feelings.

When Daniel Libeskind designed the Jewish Museum, he worked according to a method called mapping.[77] For this, he used a map of Berlin and put dots on all locations that had been important in the Jewish history and the history of Berlin.[78] Then, he randomly connected the dots with straight lines which resulted in a map full of lines. Finally, he took out the lines that were under a sharp angle which resulted in a zigzag shaped plan with sharp corners, which at the same time resembled a disfigured star of David. The zigzag plan is more or less drawn from the lines of the history of Berlin (it resembles for example the arbitrary path of the Berlin Wall), but through the zigzag plan a second line was drawn that was more or less based on the Jewish history. At the places where the zigzag plan and the Jewish line meet, voids are introduced through all floors of the building, represent the hiatus of Jewish elements in the history of Berlin.[79] These dark voids show the damage that has been done as well as the high level of entwinedness of Jewish history and the history of Berlin.

The openings in the facade of this zigzag building are drawn from the same historical maps. Because the openings are based on these lines, they appear more are as cuts in the skin of the building than the usual opening for a window. The silvery zinc skin together with the sharp angles of the zigzag plan remind one of the edge of a knife or the teeth of gears and all the devastating power that these can facilitate. Clearly, the cuts (or scars) and the jagged profile of the building represent the turbulent history of both the Jews and Berlin.

Also the interior of the building is largely determined by the maps of Jewish and Berlin history. Especially the first part of the interior spaces relate heavily to these combined histories — they consist of three axes symbolising the ways of life of the German Jews: the Axis of Continuity, the Axis of Emigration and the Axis of the Holocaust. The last one ends in the darkest, highest and narrowest

Top: Sketches from Libeskind's design process showing the mapping and the transformation of the history of the Jews and Berlin into the building's final shape

Bottom: Facade of the Jewish Museum

void, the Holocaust Tower, which is only lit by a tiny bit of daylight from the top, representing the almost absent hope for a brighter day during the Holocaust. The Axis of Emigration ends in the Garden of Exile, which is a space outside of the museum that symbolises both fear and hope. Here, a narrow seven by seven matrix of skewed stelae resemble the oppression that forces the need for exile, while the fresh air, bright daylight and the olive trees that grow on top of the stelae express the optimism of new location and longevity.[80] The Axis of Continuity leads the visitor out of the dark "untergeschoss" up the stairs into the rest of the museum. There, the carefully sculpted spaces and the architectural narrative make way for more generic space for exhibitions.

But despite all the architect's intentions, when I visited the museum, I found that the building worked only partly on me. Whereas the facade did transfer its expression of aggression and distortedness on me, the expression of the interior of the museum was a bit disturbed.

When I entered the museum, a dark coloured staircase was waiting in the corner of the entrance building to take me down into the underworld. At the bottom of the stairs I arrived in the daylight-deprived "untergeschoss", at the one end of the Axis of Continuity.

However this hallway with its white walls and black ceiling and the dark floor was not as empty and impressive as it is usually portrayed, which makes a huge difference on the expression of the space. Instead of the restrictive and monochrome appearance in the magazines, it was filled with tourists wearing brightly coloured clothes that blocked the view to the end of this long corridor.

Also the experience in the Holocaust Tower was influenced by the presence of other people. If I would have been really alone, the kind of terror that this tower expressed would have probably frightened me more. But because I did not feel left to my fate due to the presence of the other visitors, I instead started noticing the high level of detail in the concrete walls that surrounded me and how the slight amount of light emphasised all the irregularities that had been in the formwork of the walls.

Also the Garden of Exile did not evoke a feeling of oppression in me, again due to the presence of other visitors and because the weather was very nice. In the absence of anything that made me and others want to go away from this place, the lines and rows of stelae turned into a fascinating place for surprising

encounters with other visitors.

However, one element inside the museum was able to evoke a feeling of fear in me: a work of art by Menashe Kadishman called “Shalechet” (Fallen Leaves) that was installed on the floor of one of the other voids. It consisted of thousands of round steel discs, from which fearful faces were carved out. Due to the nature of the material and the method used to carve out the faces, all the discs had a slightly different colour and expression. They seemed to be a large crowd shouting at me in fear and silence.

Again it were people that had a profound influence on my experience of the space. But this time, instead of the comforting feeling that the visitors had given me in the Holocaust tower, the faces that I saw expressed fear and that feeling transferred over to me.

I had to cross the discs physically in order to continue to the next space by walking over the faces. Together, they formed an uneven floor that was hard to walk across — together with the fearful expression their unbalancing effect made me feel the emotional and physical disturbance of fear.

Clearly the presence of other visitors influenced my experience of the environment. The question thus is, would a place with a similar expression as the Jewish Museum make me scared or depressed when it would be empty of people?

Holocaust Memorial, Berlin

The same holiday that I visited the Jewish Museum, I went to see Peter Eisenman’s (1932 -) Holocaust Memorial.[81] Eisenman intended this memorial to operate through the experience of it, as opposed to a memorial that works with memory and awareness of history. So instead of the usual tablet inscribed with names of the victims, Eisenman decided to design something different — an area of 19000 square meters covered with a matrix of 2711 identical concrete columns (or stelae) of which only the height differed.[82] Just like in the Garden of Exile, one can walk in between the stelae through the memorial site. The floor of the area slowly slopes down towards the centre of the memorial, where the stelae are at their highest.

When I walked towards the side of the project, the sidewalks next to the monu-

ment were crowded and Berlin's lively vibe was sensible all around me — there was the noise and dust of a construction site, in the Tiergarten park there were people laughing and enjoying the summer and to the side of the monument people were using the tops of the stelae as picnic tables. After some initial observations at the side of the monument, my curiosity drove me inward.

The slope of the floor gently moved me towards the centre of the monument. Slowly, the stelae made Berlin's city vibe fade out — the noise of the traffic and the construction site dissolved, Tiergarten's green trees disappeared from sight, encounters with tourists became increasingly rare. The liveliness and variance in sensory input of the city changed into the monotony of concrete grey stelae with uniform surfaces against a grey cobblestone floor and a grey clouded sky. At the centre of the memorial site I found myself immersed in dullness and for a moment it seemed as if there would never be a way out. A complete lack of variety of sensory input and of a sense for a quick way out momentarily drained me of my zest for living, leaving me with a feeling of hopelessness.

Additionally, due to the sheer size of the memorial area one does not encounter anyone else when one is inside. Whereas these encounters with other people made the Jewish Museum into a more social place, here one stays on one's own in an endless field of dull repetitions. Most ironically, if one encounters any signs of human life within the monument it are most likely the sounds of the German police officers that shout after every playful child that uses the tops of the stelae as stepping stones. Their barking voices get a frightening meaning in this context of the terrors of the Holocaust.

Instead of bringing back memories of warmth and security such as in the Bruder Klaus chapel, which interior space has about the same dimensions as the interstitial spaces of the Holocaust memorial, the latter brought back memories of Primo Levi's *Se questo è un uomo*, of oppression and isolation.[83] One looks around and every direction reveals the same endless repetitive hopelessness. It is no coincidence that the memorial is not closed off at night — even though it provides good hiding places, not even a tramp would want to sleep in this place.

Notre-Dame du Haut, Ronchamp

In the summer of 2009 I went to see Le Corbusier's (1887 - 1965) Notre-Dame du Haut.[84] The chapel is situated in the French Vosges on the Bourlémont hill

The Notre-Dame du Haut just before the thunderstorm

close to an old miner's village called Ronchamp. The hilltop itself had a long history of religious importance. Before the Romans had conquered the place, it had been a holy place for sun-worshippers.[85] Located on the invasion route from the East, it had served as a Roman camp when they conquered the French area. Since the 4th century there had been a Christian church on the site, which was of both military and religious importance. Later, after the Reformation, the Holy Virgin, to whom the place was devoted, served as the bulwark against Calvinism and Lutheranism that thrived across the border on the east side.[86]

Le Corbusier managed well to capture this spirit of religious activity in his new design that replaced the old chapel that had been destroyed during WWII. From far away one can already see the white chapel beaming its presence into the surrounding landscape. But as soon as one gets closer, the chapel is hidden from view, only to gradually reappear when one completes one's architecture pilgrimage walking up the hill from the parking lot — first its three light-capturing towers reappear from behind the hedge, then the inverted crab-shell roof and finally, once you are at the top, the chapel is suddenly there in its whiteness and convex and concave curved forms.

When I was there, it was at the end of the summer, and it had been raining a lot in the Vosges. As a result, the surrounding grass and trees had a deep green colour. A small shower that had been there just before I arrived had further amplified the already vibrant greens of the surroundings and the white concrete exterior of the chapel, and had turned the whole, with the help of a watery sun, into a glittering scene. I walked around the chapel, taking in the incredibly well composed harmony of the parts of the building, when a heavy thunderstorm announced itself and I had to walk into the chapel to take shelter from the rain.

I was surprised by the darkness inside and found that the perforated south wall as well as the three light-capturing towers barely let any light in. The contrast between the radiating whiteness of the exterior and the gloominess of the interior couldn't be any bigger. Where the outside had made on me the impression of a pearl, the inside, with the only light coming from candles, reminded be of cold and stony castle catacombs from the Middle Ages. Burke has argued that darkness and pain are sublime, but I would only agree with him if I would consider death as sublime.[87] To me life is the sublime, and it is lightness that I associate with that because lightness is the source of all life. Clearly, le Corbusier thought

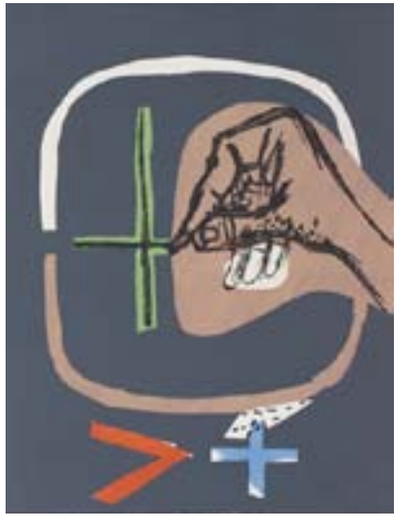
of this the same way when he said that “architecture is the masterly, correct and magnificent play of masses brought together in light”.[88]

As soon as the rain had stopped I walked outside towards the stone pyramid on the east edge of the site and observed how the chapel seemed to clear itself of the rain the way dogs dry themselves through centrifugal force after taking a bath. Here however, most of my impression of force was not a result of me seeing any physical force, but a consequence of an expression of force through its curved and upwardly pointed roof like the horns of a bull, heavy but seemingly easily carried by the east wall and a column. Le Corbusier had always claimed that buildings should be white by law and in this moment it became very clear why. Whiteness and lightness have always been an expression of life and sanity, probably because of the association of sanity and white teeth and bright white of the white of the eye. Reflecting materials, such as ivory, gold, silver, platinum and diamond have been used since time immemorial for jewellery that had to express life and sanity.[89]

The second time I entered the chapel the interior was empty and silent. The moment that my pupils had adjusted to the lower light levels inside, a last patch of cloud disappeared before the sun and suddenly the chapel was flooded with light. It came from all sides of the interior: down the light capturing towers reflecting on the gunite on the walls, giving them a velvet-like impression, and through the tiny slit between the walls and the roof, causing the impression that the roof was floating. But most of the sun’s rays entered the chapel directly through the holes punctured in the south wall that were filled with colourful stained-glass windows, steeping the interior of the church in all kinds of warm tints. In the east wall various tiny holes were brought to life through the bright light, appearing like stars, with in their middle a larger opening that framed a statue of Mary Magdalene. The light that entered the chapel from behind her seemed to radiate her spirit into the interior, and with the light getting more intense I realised that I was in the holy house (or maybe even the womb, as the gunite curved walls could be interpreted as its veined walls) of Mary and she would take care of everything.

I sat down on one of the church benches that stood there, bathing in the sunlight that entered through the south wall. The radiating heat and the warm colours, the wooden benches, all made me feel very alive and energetic and yet

Mary’s presence radiates into the interior of the church



totally still, undemanding. Unlike most other Christian churches, which, due to their verticality and scale, would constantly give me the feeling that a curse could be laid on me if I didn't live up to God's expectation, this chapel, with its more modest scale, gave me an at-home like feeling, where everything was all right.

The forceful appearance on the outside emphasised this safety in the interior, as if it would protect you once you would be inside. The building expressed the strength and at the same time the compassion that Le Corbusier associated with women in general.[90] As such, the chapel was for him not so much a place of worship for Mary, but a symbol for the unification of the sexes, which according to Le Corbusier was the way towards spiritual enlightenment. It emphasises the qualities of the female and hints at unification in various ways.

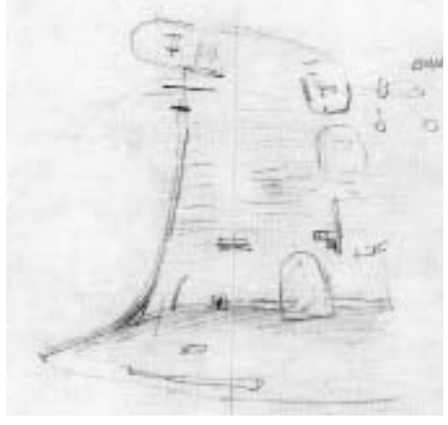
For example, the message of the feminine is emitted by the statue of Mary in the east wall and amplified through the converging section of the chapel.[91] Mary's (or the feminine) virtues are beamed into the chapel through the inscriptions in the windows in the south wall — 'je vous salue, Marie', 'bénie entre toute les femmes', 'étoile du matin' and 'Je t'aime'. Additionally, Le Corbusier's favorite scene of François Rabelais' Gargantua and Pantagruel — in which Panurge learns that he should marry a woman — is symbolicly depicted in the fountain to the west side of the chapel.[92] [93]

It is in Le Corbusier's Le Poème de l'angle droit, published in the same year as the initial drawings of the chapel, where we can find the final hints at his intended meaning of the chapel. [94] Clearly, Le Corbusier hints at unification when he writes:

I thought that two hands
and their fingers intertwined
might express the left and
right pitilessly standing
together and so necessarily
to be reconciled.

This last poem is accompanied by a single picture of a hand that draws the horizontal line of a cross (the right angle) through the vertical line, which is surrounded by an unclosed chamfered rectangle. The cross here probably rep-

Top: The fountain on the west side of the chapel symbolicly depicts Le Corbusier's favorite story of the union of the sexes
Bottom: The icon 'Tool' in Le Corbusier's *Le Poème de l'angle droit*



resents the union of female and male, just as Adolf Loos had described its meaning in 'Ornament und Verbrechen' (1908) which was featured in the first edition of Le Corbusier's magazine 'L'Esprit Nouveau'.[95] In this manifesto Loos writes of the first ornament being the cross, the horizontal dash representing a prone woman and the vertical dash the man penetrating her. The amorphous rectangle surrounding the copulating cross probably represents the womb or the place where the woman and the man meet. Most importantly, it clearly resembles the plan of the three altar rooms in the chapel.

Thus Le Corbusier did not intend the altar rooms as a place to worship God and study the bible, which is nowadays the central element in these altar rooms, but instead the altar rooms are intended to point the visitor to where Le Corbusier thought that enlightenment and salvation could be found — the unification of the sexes.

For the layman however, the symbolism that refers to the unification of the sexes is hard to understand from just visiting the building. Still, Le Corbusier succeeded in designing a building that many find beautiful. Its highly uncommon profile, the central placement of Mary's statue and the building's curved shapes make clear to everyone living in western cultures (where the orthogonal shapes dominates the built environment) that this building venerates the feminine, instead of the usual masculine.

Top: the south-western altar chamber

Bottom: Early floorplan of the chapel shows the similarity between the 'Tool' and the altar chambers

Notes

1. Moussavi, Farshid, Michael Kubo, and Harvard University. Graduate School of Design. 2006. The function of ornament. Barcelona Actar. &

Moussavi, Farshid, and Daniel Lopez. 2009. The function of form. Barcelona ; New York Cambridge, Mass.: Actar.

2. Arthur E. Stamps, Physical Determinants of Preferences for Residential Facades, Environment and Behavior November 1999 vol. 31 no. 6 723-751

3. Haggbloom, Steven J.; et al., Renee; Warnick, Jason E.; Jones, Vinessa K.; Yarbrough, Gary L.; Russell, Tenea M.; Borecky, Chris M.; McGahhey, Reagan et al (2002). "The 100 most eminent psychologists of the 20th century". Review of General Psychology 6 (2): 139–152.

4. O'Donohue 2001, p. 55.

5. Skinner 1976, p. 326.

6. O'Donohue 2001, p. 55.

7. O'Donohue 2001, p. 68 and p. 105.

8. The term black box is well known for its reference to the flight recorders of aircrafts. These "black boxes" (usually orange) could be used in the investigations after an aircraft accident to reveal the exact circumstances under which the accident happened. in science, the term black box refers to a system or object whose internal workings are not open to inspection. Using controlled input on the black box and investigating its output, its internal workings can be induced.

9. O'Donohue 2001, p. 67.

10. O'Donohue 2001, p. 94.

11. O'Donohue 2001, p. 80.

12. René Descartes 2012. Encyclopædia Britannica Online. Retrieved 16 March, 2012, from http://www.britannica.com/EBchecked/topic/158787/Rene-Descartes

13. Descartes 1650, art. 13.

14. Descartes 1650, art. 7.

15. Mattheson, Johann, and Margarete Reimann. 1954. Der vollkommene Capellmeister, 1739. Faksimile-Nachdruck, Documenta musicologica 1 Reihe, Druckschriften-Faksimiles. Kassel,: Bärenreiter-Verlag.

16. O'Donohue 2001, p. 94.

17. Also Pavlov found this, with his famous experiments on dogs, food and environmental conditions. Pavlov tested different environments (stimuli) on dogs to see what their effect on salivation would be. All dogs were preconditioned in such a way that a certain luminous excitant L would cause them to lose ten drops of saliva through the association with the food they would get. Then, Pavlov experimented two variables, the ticking of a metronome M, weakly associated with food, and the sound S, which was not associated with anything at all. The results of the experiment turned out to be rather unpredictable — whereas the initial stimulant L caused ten drops, stimulant M alone four drops and stimulant S zero, any combination of them never caused a number of drops that was either the sum or the subtraction of any of the stimulants initial results (L + S + M = 10; L + M = 10; S + M = 4 ; L + S = 0) Small environmental differences can have considerable impact on behaviour. (Merleau-Ponty 1963, p. 53.)

18. An example of applied environmental psychology: Dutch electronics manufacturer Phillips actually developed a lamp that can keep certain lighting conditions stable. It can be set to "morning" so that it resembles the melatonin-supressing frequency of early-morning light, allowing you to trick your body into feeling awake at midnight. The lamp is considered ideal for offices where people have to work at night too, as the light has a considerable effect on working behavior — morning light makes the mind more alert.

19. For example through olfaction and its effects on our endocrinological system as A. S. Parkes and H. M. Bruce explain in their research on mammalian reproduction (Hall 1969, p. 33-34.) See also the transcribed experience of Libeskind's Jewish Museum in the appendix for the influence of others on experience.

20. Darley, John M, and C Daniel Batson. "'From Jerusalem to Jericho': A study of situational and dispositional variables in helping behavior.." Journal of Personality and Social Psychology 27, no. 1 (1973): 100–108.

21. Gladwell 2009, p. 137-139

22. in strictly mathematical sense, an equation with two unknowns does not have zero solutions, but infinite solutions. The effect remains the same: no conclusions regarding the variables can be made.

23. Merleau-Ponty 1963, pp. 190-192.

24. Brown 2006, p. 28.

25. Merleau-Ponty 1963, p. 247, note 29.

26. For further reference also see Merleau-Ponty's L'Union de l'ame et du corps chez Malebranche, Biran et Bergson,Vrin, 1968 Paris

27. Maurice Merleau-Ponty 2012. Wikipedia. Retrieved 16 March, 2012, from http://en.wikipedia.org/wiki/Maurice_Merleau-Ponty

28. Even though Descartes' Passions, Dioptrique and the Treatise on Man are only mentioned towards the end of the book (Merleau-Ponty 1963, pp. 191-192, 195-197), Descartes' causal thought is really at the heart of the physiological and anatomical explanations for behaviour and perception that Merleau-Ponty is critisising throughout the whole book.

29. Merleau-Ponty adopts the notion of Gestalt from Gestalt theory. Gestalt theory originated in the early twentieth century when Max Wertheimer, Kurt Koffka and Wolfgang Köhler — students of the Berlin School of experimental psychology — published a study on the perception of movement. Gestalt theory emphasizes that wholes are greater than its parts, and more importantly, that the attributes of the whole are not deducible from the analysis of its isolated parts. Gestalt theory thus provided an alternative for the at that time prevailing reductive methods in science. (Gestalt psychology 2012. Encyclopædia Britannica Online. Retrieved 16 March, 2012, from http://www.britannica.com/EBchecked/topic/232098/Gestalt-psychology)

30. Real here is meant as the state of things as they actually exist, not as they appear or can be thought of.

31. Merleau-Ponty 1963, pp. 138-139.

32. Interestingly, this is when we say of a design that it becomes alive too — where Merleau-Ponty says that "the phenomenon of life appeared [..] at the moment when a piece of extension [..] turned back upon itself and began to express something, to manifest an interior being externally." (Merleau-Ponty 1963, p. 162) We think of a design as if it has "life" in it when it starts to express its own significance in the situation clearly and all its parts have integrated into a whole that has additional value and functionality added to the sum of its parts and whose structure also relates to structures beyond the physical shape of the design.

33. Merleau-Ponty 1963, p. 145.

34. Merleau-Ponty 1963, p. 175.

35. Merleau-Ponty 1963, p. 162.

36. Merleau-Ponty 1963, pp. 210-211.

37. Merleau-Ponty 1963, p. 211.

38. It remains questionable whether this is really the way perception works. Further research in the cognitive sciences might explain what the role of the association zone in the brain really is and what implications this might have for our conception of perception. However, Merleau-Ponty clearly shows that a causal relation between the environment and the perceiver is not sufficient to explain perception and offers, with the introduction of Gestalt, a plausible alternative, although by its own nature impossible to verify physically.

39. O'Donohue 2001, p. 92.

40. Burgess, Anthony. 1986. A clockwork orange. [New American ed, Norton paperback fiction. New York: Norton or Kubrick, Stanley, Malcolm McDowell, Patrick Magee, Adrienne Corri, Miriam Karlin, Wendy Carlos, Anthony Burgess, Warner Bros., and Warner Home Video (Firm). 2001. A clockwork orange. Burbank, CA: Warner Home Video.

41. Merleau-Ponty 1963, p. 123

42. One could say that the function of learning itself does not necessarily have to be functional for another structure, as long as it is functional for the sake of learning. Stephen Jay Gould, a contemporary biologist, explains that this kind of experimenting for the sake of developing new valuable structures is indeed present everywhere where vital and human structures are at work. He argues that "all biological structures (at all scales from genes to organs) maintain a capacity for massive redundancy — that is, for building more stuff or information than minimally needed to maintain an adaptation. The 'extra' material then becomes available for constructing evolutionary novelties because enough remains to perform the original, and still necessary function." (Gould 1996, p. 45.)

43. Merleau-Ponty 1963, pp. 212-213.

44. Pellegrini, R.J., A.G. Schauss, and M.E. Miller. "Room Color and Aggression in A Criminal Detention Holding Cell: A Test of the 'Tranquilizing Pink' Hypothesis." Journal of Orthomolecular Psychiatry 10, no. 3 (1981): 174–181.

45. Walker 1991, pp. 50-52.

46. In a way the time-related changes in behaviour of prisoners in pink rooms is similar to what Immanuel Kant (1724-1804) thought of as a sublime experience. He said that the sublime comes with a double blow, the first unconsciously causing a psychic disturbance and the second igniting a conscious realisation: what had just caused this? (Healy 2003, p. 48)

One can imagine that the experiment has worked similarly on the prisoners — where they had expected a prison, gloomy and dark as they were used to, they were surprised by the sudden pinkness of the place (a colour that they had maybe only associated with little girls rooms) which temporarily made them abstain from their usual behaviour. Then, the second blow comes when they realise, at the moment that they have gotten used to the colour, that their behaviour actually changed because of the surprise by the first blow. As a reaction, they might feel the need to strengthen their sense of self and they do this by carrying out their original behaviour, but this time in a more vehement way, which might explain the increased aggression after the initial decrease.

If the sublime really works this way, if you can get used to the situation that causes it so that it becomes normal, that would also mean that any environment that causes a genuine experience normalises over time. At least, as long as no new conditions that cause a sublime experience arise. The answers to these problems are however beyond the scope of this research.

47. Pellegrini, R.J., A.G. Schauss, and M.E. Miller. "Room Color and Aggression in A Criminal Detention Holding Cell: A Test of the 'Tranquilizing Pink' Hypothesis." Journal of Orthomolecular Psychiatry 10, no. 3 (1981): 174–181.

48. Abraham H. Maslow 2012. Encyclopædia Britannica Online. Retrieved 20 March, 2012, from http://www.britannica.com/EBchecked/topic/367986/Abraham-H-Maslow

49. Lowry 1973, pp. 181-196.

50. Maslow 1977, p. 25.

51. Lowry 1973, pp. 153-154.

52. Lowry 1973, pp. 154-165.

53. Maslow 1977, p. 21.

54. Maslow & Lowry 1998; Maslow 1971.

55. And we can also reconsider the seriality of Maslow's theory itself. Is it not so that we can have a desire to know and to fulfil our potential even if we have been thwarted in our love needs? And is it not so that a person with a high self-esteem sometimes becomes so confident that the desire for fulfilling any potential disappears?

Social psychologist Roy Baumeister did a lot of research on self-esteem, which along with publications by many other psychologists that were inspired by Maslow's theory led to increased attention for the encouragement of the development of self-esteem in children in the 1970's and 80's in the United States. They thought that most psychological problems were problems caused or at least partially caused by a lack of self-esteem, and so they developed programs for the education and upbringing of strong children that were to improve this self-esteem through affirmation — the child was told that he was very good at things and therefore the academic skills would improve.(Baumeister and Tierney 2011, pp. 188-189) But when Baumeister and others really looked at the results of improving self-esteem through affirmation they found out that there was no correlation between affirmation and academic results. In fact, when students of Virginia Commonwealth University that got a C grade or worse on their midterm were randomly assigned to receive either a weekly affirmation message or a weekly neutral message, their grades on the final exam correlated negatively with the amount of affirmation — the students whose self-esteem was boosted scored even lower on their final exam than on their midterm as their average score dropped from 59 to 39.(Forsyth et al. 2007, pp. 447-59) Moreover, another study on high school students showed that there is a positive correlation between self-esteem and good academic results, but that it are the academic results that determine the level of self-esteem instead of the other way around. The self-esteem of the tenth graders was not able to predict their results in twelfth grade, but the results of the tenth graders did predict their level of self-esteem in twelfth grade.(Baumeister et al. 2003, pp. 1-44)

From the students stunted actualisation process we can conclude that Maslow's hierarchy does not have a strict order. Contrarily, the different needs and desires seem to be able to influence each other, where satisfied higher needs can exist simultaneously with thwarted lower needs and saturated lower needs can preclude the desire to satisfy higher needs. Therefore it is more logical to apply one of Maslow's main influences to his theory — the psychology of Gestalt. It is concerned with the parallel and holistic processes of the mind. As Merleau-Ponty explains, the nervous system does not work with binary processes that trigger certain behaviour, but more as a whole composed of separate parts that each influence the total form which determines the behaviour.(Merleau-Ponty 1963, pp. 46-47, 91, 127.) Such a framework we could apply to Maslow's different needs and resulting behaviour — every of the five needs is connected as a vector to a form, and with the thwarting or (in)complete satisfaction of a need, its corresponding vector changes position, colour, radiance, acceleration, etcetera accordingly. But each vector represents another form, in which all past experiences, things that one has learned and things that one senses right then are represented. At the moment of behaviour, it is the total form of all vectors combined that constitute the exact behaviour. The experience of architecture, which is covert behaviour, works accordingly.

56. That Maslow included sex as a primary physiological needs has been questioned over and over since the introduction of the theory in 1943. Ofcourse sex is of great importance for the survival of the species in general, but it is questionable whether sex really is a need that needs to be satisfied at this basic level of individual development

57. Wolverton 1997, p. 11

58. Hall 1966, p. 115

59. Hall 1966, pp. 33-34, 49.

60. Hall 1969, pp. 116-125.

61. Hall 1969, p. 170.

62. Most probably there is also a connection between the experience of material and our feelings of love and belonging. This, however, requires another research.

63. Lowry 1973, p. 162.

64. In Dutch: "De muren komen op mij af"

65. Hall 1969, p. 162

66. In Learning from Las Vegas, Venturi, Izenour and Brown advocate the use of architecture as a decorated shed, where space and structure are at the service of the functional program with ornamentation applied to it, over the use of architecture as a "duck", in which space, structure and functional program are dominated by an overall form. (Venturi 1977, p.87) The problem with their argument is that they ignore the fact that we want a decorated shed and not the undecorated shed as well as the question why this is so. As will be argued in the next paragraphs, this is because of our search for meaning. By subjecting the architectural systems of space and structure to purely functional demands, their expression is automatically that of functionality, thereby significantly reducing the pos-

sibilities of and diversity in architectural expression.

67. For example, Lisa Heshong's interesting Thermal Delight in Architecture explains the different uses of temperature and how it can afford feelings of delight, affection and sacredness.

68. In many ways the equating of peace and freedom in an architectural setting resembles Heidegger's conception of dwelling. In Building Dwelling Thinking he says that "to dwell, to be set at peace, means to remain at peace within the free, the preserve, the free space that safeguards each thing in its nature". (Heidegger 1971, p. 149.)

69. Karl Friedrich Schinkel 2012. Encyclopædia Britannica Online. Retrieved 20 March, 2012, from http://www.britannica.com/EBchecked/topic/527396/Karl-Friedrich-Schinkel

70. Green 1987, p. 105.

71. Peter Zumthor 2012. Encyclopædia Britannica Online. Retrieved 20 March, 2012, from http://www.britannica.com/EBchecked/topic/1233448/Peter-Zumthor

72. Sachseln. The Life of Brother Klaus 2012. Retrieved March 1st, 2012, from http://www.bruderklaus.ch/?id=209

73. Kimmelman 2011, The ascensions of Peter Zumthor, Retrieved 28 Februari, 2012, from http://www.nytimes.com/2011/03/13/magazine/mag-13zumthor-t.html?pagewanted=all

74. Stadt Mechernich, Retrieved 28 Februari 2012, from http://mechernich.de/seiten/tourismus_freizeit/sehenswuerdigkeiten/50_05_Bruder-Klaus-Kapelle.php

75. Zumthor 2003, pp. 23-29.

76. Daniel Libeskind 2012. Encyclopædia Britannica Online. Retrieved 20 March, 2012, from http://www.britannica.com/EBchecked/topic/914364/Daniel-Libeskind

77. Dogan (n.d.), p.4.

78. Libeskind, Berlin Museum Jèudische Abteilung, and Feireiss, Erweiterung Des Berlin Museums Mit Abteilung Jèudisches Museum, p.63.

79. Dogan (n.d.), pp.14-15.

80. Olive trees are known for their longevity, they can be over 2000 years old (Olive 2012, WIkipedia, retrieved 20 Februari 2012, from wikipedia http://en.wikipedia.org/wiki/Olive)

81. Peter Eisenman 2012. Encyclopædia Britannica Online. Retrieved 20 March, 2012, from http://www.britannica.com/EBchecked/topic/1103012/Peter-Eisenman

82. Schlusche 2012, Stiftung Denkmal für die ermordeten Juden Europas: Peter Eisenman. Retrieved 20 Februari 2012, from http://www.stiftung-denkmal.de/denkmaeler/denkmal-fuer-die-ermordeten-juden-europas/stelenfeld/peter-eisenman.html#c1793

83. Levi, Primo. 1947. Se questo è un uomo. Torino: F. de Silva.

84. Le Corbusier 2012. Encyclopædia Britannica Online. Retrieved 20 March, 2012, from http://www.britannica.com/EBchecked/topic/137221/Le-Corbusier

85. Curtis 1986, p. 179

86. Green 1987, p. 247.

87. Burke, E. 1909-1914 On the Sublime and Beautiful Part IV, Chapter 16:"Why darkness is terrible"

88. Le Corbusier 1986, p. 29.

89. In the Blombos cave in Kenia beads made from shells were found that date back 75000 years. d'Errico, F., Henshilwood, C., Vanhaeren, M., van Niekerk. K. 2005. Nassarius kraussianus shell beads from Blombos Cave: Evidence for symbolic behaviour in the Middle Stone Age. Journal of Human Evolution 48:3–24.

90. See Samuel 2004, p. 61, which offers a superb insight into Le Corbusier's philosophies on the feminine.

91. Le Corbusier here used this concept that he copied from the design of the Greek amphitheatre, which was also designed for maximum audibility of the orator on the stage among the audience with the help of Pythagoras harmonious mathematics, as he explains in his 'Precisions'. He used the same concept several times before in his designs for auditoria. (Le Corbusier 1991, p. 165.)

92. Samuel 2004, p. 59-60.

93. Just as the fountain where Bacbuc orders Panurge to drink from the Holy Bottle, this pond is filled halfway with water. Within the pond are a large oval cylinder, into which the water drops from the roof, and a bigger and a smaller pyramid. Obviously, this larger pyramid represents the Egyptian high-priestess Bacbuc, telling the smaller pyramid to drink from the oval cylinder, representing the oval Holy Bottle.

94. Corbusier, Le. 1955. Le Corbusier. Poème de l'angle droit . Lithographies originales [de l'auteur]. Paris, Tériade (impr. de Mourlot frères).

95. M. Christine Boyer 2010, p. 347.

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