Natural Stone Tectonics in Maastricht

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Analyzing the natural stone tectonic culture in Maastricht

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Content

Temple of Segesta, Sycily, 420 BC (picture by author)

Introduction

This research was undertaken in the context of the Master Graduation Studio 'Maastricht, City of Stone' organized by the chair of Interiors Buildings Cities at the Department of Architecture of Delft University of Technology.

The research was triggered by my visit to the temple of Segesta in Sycily. My memories of this visit are very lively also due to the fact it was part of one of my last holidays with my father. Next to the exceptional situation in the landscape this Doric temple is special because it was never finished. From the moment it was build it only showed the outer structure made from local limestone and, although it was never carrying anything but itself, this structure very much gives the feeling of heaviness and load as if it was indeed carrying something apart from itself.

By walking through Maastricht I got a comparable sense of heaviness that I don't get in other Dutch cities, for example in Delft. I think this heaviness has to do with the use of natural stone. Most of the buildings in Maastricht use this material as an accent but I noticed there is also a special type of building that completely covers the facade in Belgian blue limestone. Moreover, these buildings share a certain building logic and especially an ornamentation that is rooted in structural principles, they are tectonic.

The research is focussed on this building type and starts with a mapping of these buildings in the city centre. Second it studies a very articulated example, 'In Den Steenen Bergh', to find out about its building logic and modes of tectonic expression. The results are related back to some examples leading to a formulation of the natural stone tectonic tradition in Maastricht and finally to conclusions about the culture of Maastricht.

Mapping

The following pages show which buildings in the city centre of Maastricht have facades that are completely covered or build out of blue limestone. Notable is that this building tradition seems to have started in the second half of the 17th century. Before there were public buildings, like churches or cloisters, with facades completely out of local natural stone, but it seems that the first building that used belgian blue limestone for this was the city hall. Compared to these buildings the city hall didn't only oppose a material tradition but also differed in its modes of structural expression. One could say that it triggered a new tradition of natural stone tectonics which then also found consequence in the private buildings.

After these pages with examples a map is shown where these buildings can be found. The map gives the impression of how the buildings together form a layer of accents through the city. I think this layer has a strong contribution to the sense of heaviness I got from the city.

Pictures of examples

4. Stadhuis XVIIc (1659)

Rechtstraat 62 XVIIc (1660)

1. In Den Steenen Bergh XVIIc (1669)

Sint Amorsplein 17 XVIIc (1675)

Bredestraat 43 XVIId (1696)

Vrijthof 50 XVIIIa (1700)

Markt 15 XVIIIa (1714)

Kleine Staat 17 XVIIIa

Vrijthof 12 XVIIIa

Vrijthof 6 XVIIIa

Maastrichter Brugstraat 16 XVIIIa

Pictures of examples

Wolfstraat 9 XVIIIa

Bredestraat 41 XVIIIa

Nieuwstraat 11 XVIIIa

Markt 33 XVIIIa

Markt 23 XVIIIa

Markt 71 XVIIIa

Grote Staat 20 XVIIIA

Tongersestraat 17 XVIIIA

5. Hoofdwacht XVIIIb (1736)

Bredestraat 3 XVIIIb

Grote gracht 37 XVIIIb (1738)

Pictures of examples

Rechtstraat 86 XVIIIb (1738)

Cörversplein 12 XVIIIb (1740)

Sint Bernardusstraat 12 XVIIIb (1743)

Markt 8 XVIIIb (1745)

Tongersestraat 18 XVIII

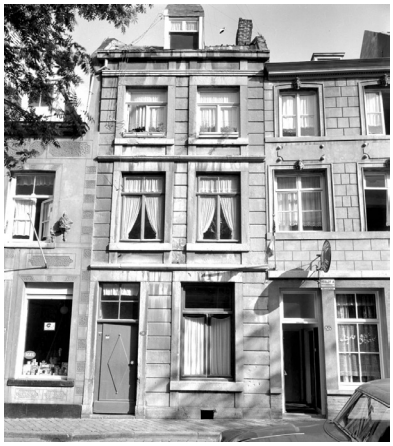
Nieuwstraat 11,13 XVIII

Muntstraat 18 XVIII

Stokstraat 51 XVIII

Nieuwstraat 22 XVIII

Rechtstraat 81-83 XVIII



Sint Bernardusstraat 31 XVIII

Kleine staat 14 XVIIIc (1751)

Pictures of examples

Grote Staat 53 XVIIIc (1754)

3. Markt 14 XVIIIc

Kleine staat 13 XVIIIc

Koestraat 7 XVIIIc

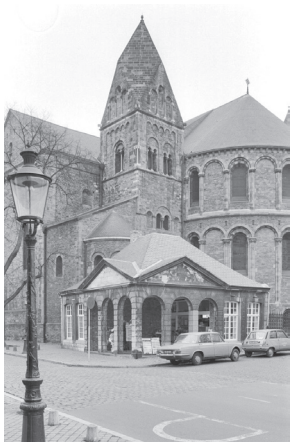
Wolfstraat 18 XVIIIc

Grote staat 29 XVIIIB

Grote staat 31 XVIIIB

Kesselskade 55 XVIIIB

Grote gracht 90 XVIIId (1785)



Graanmarkt 4 XVIIId (1786)

3. Stokstraat 11 XVIIId (1790)

Markt 6 XVIIId (1792)

Pictures of examples

Maastrichter brugstraat 6 XVIIId

Hoogbrugstraat 72 XVIIId

Hoogbrugstraat 58 XVIIId

Vrijthof 13 XVIIId

Vrijthof 44 XVIIId

Markt 68 XVIIId

Bredestraat 5 XVIIId

Achter het vleeshuis 15,17 XVIIId

Achter het vleeshuis 19 XVIIId

Achter het vleeshuis 37 XVIIId

Grote gracht 56 XVIIId

Pictures of examples

Kesselskade 48 XVIIId

Grote staat 35 XVIIId

Boschstraat 88 XVIIId

Splistraat 9 XVIVa (1809)

Kleine gracht 17 XVIVb

Map of examples

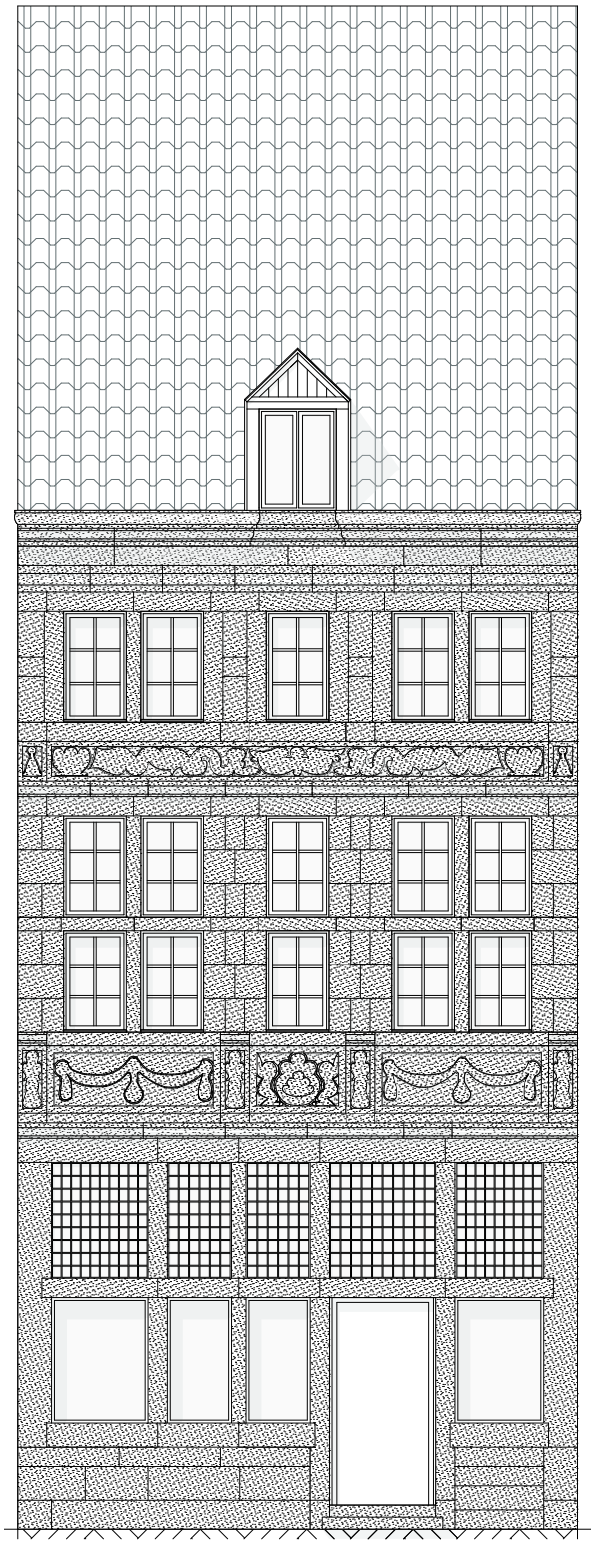
Plan | City centre of Maastricht

In Den Steenen Bergh as an example:

1. Documentation and structural analysis

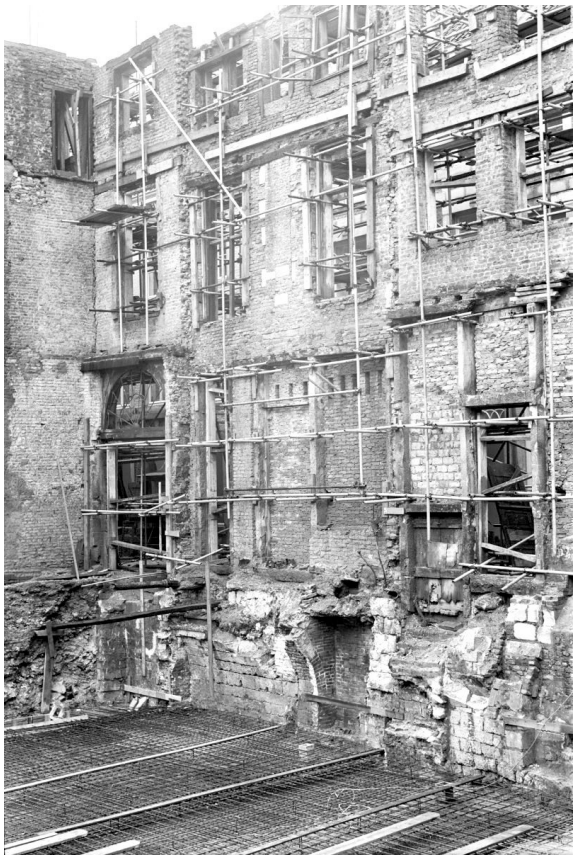
One building that serves as an example for the natural stone tectonic culture in Maastricht is 'In Den Steenen Bergh'. The following pages offer a first analysis of this building in the Stokstraat. Looking at the facade of this building you are given the impression that the natural stone is carrying the floors, beams and the facade itself. Looking at the section and exploded view however we see how there is actually a brick layer behind the natural stone. Also the mechanics scheme shows how the floors are traditionally carried through the beams by the side walls.

Pictures Stokstraat 28 (by Rijksdienst cultureel erfgoed)

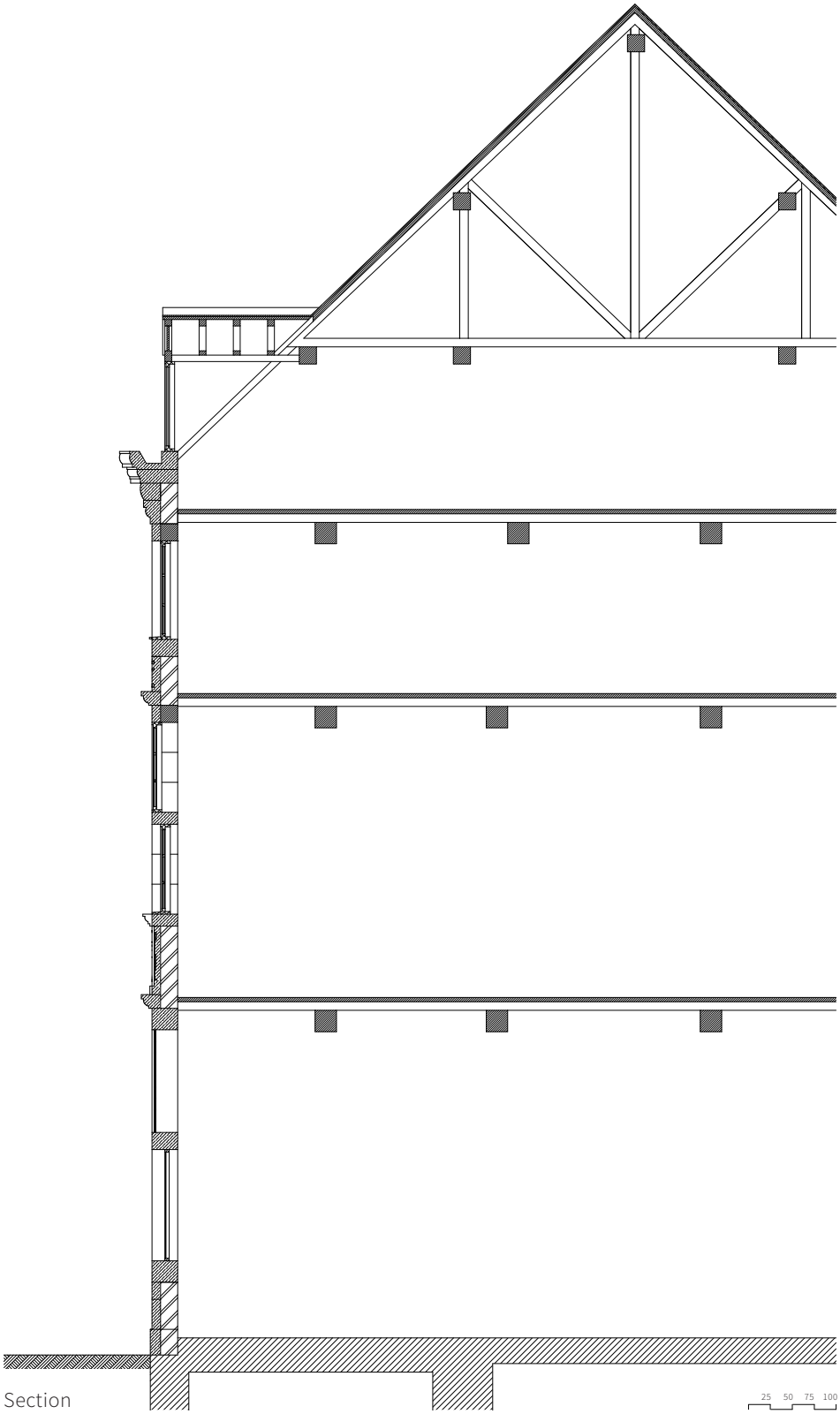


Elevation | East Facade

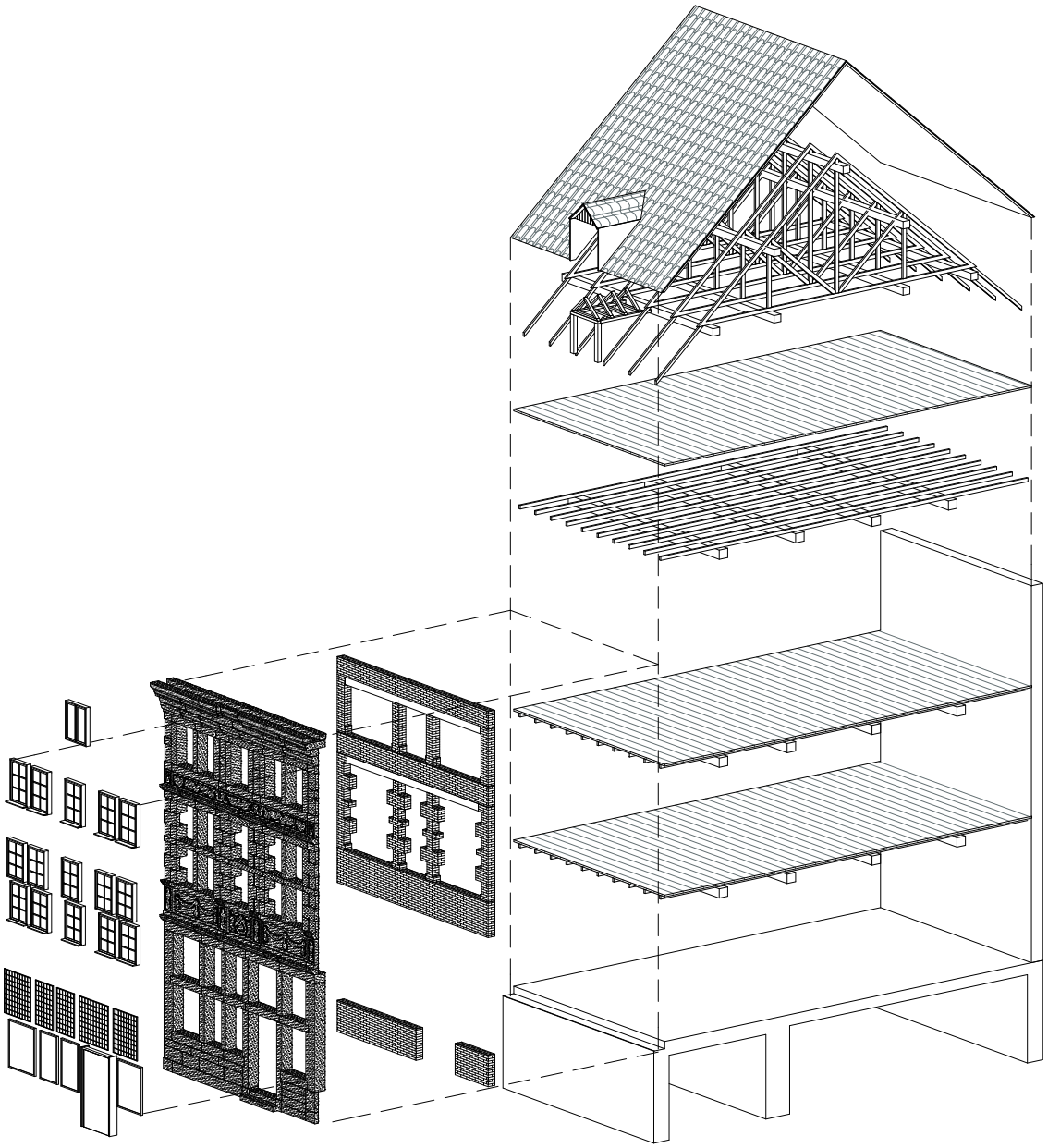
25 50 75 100



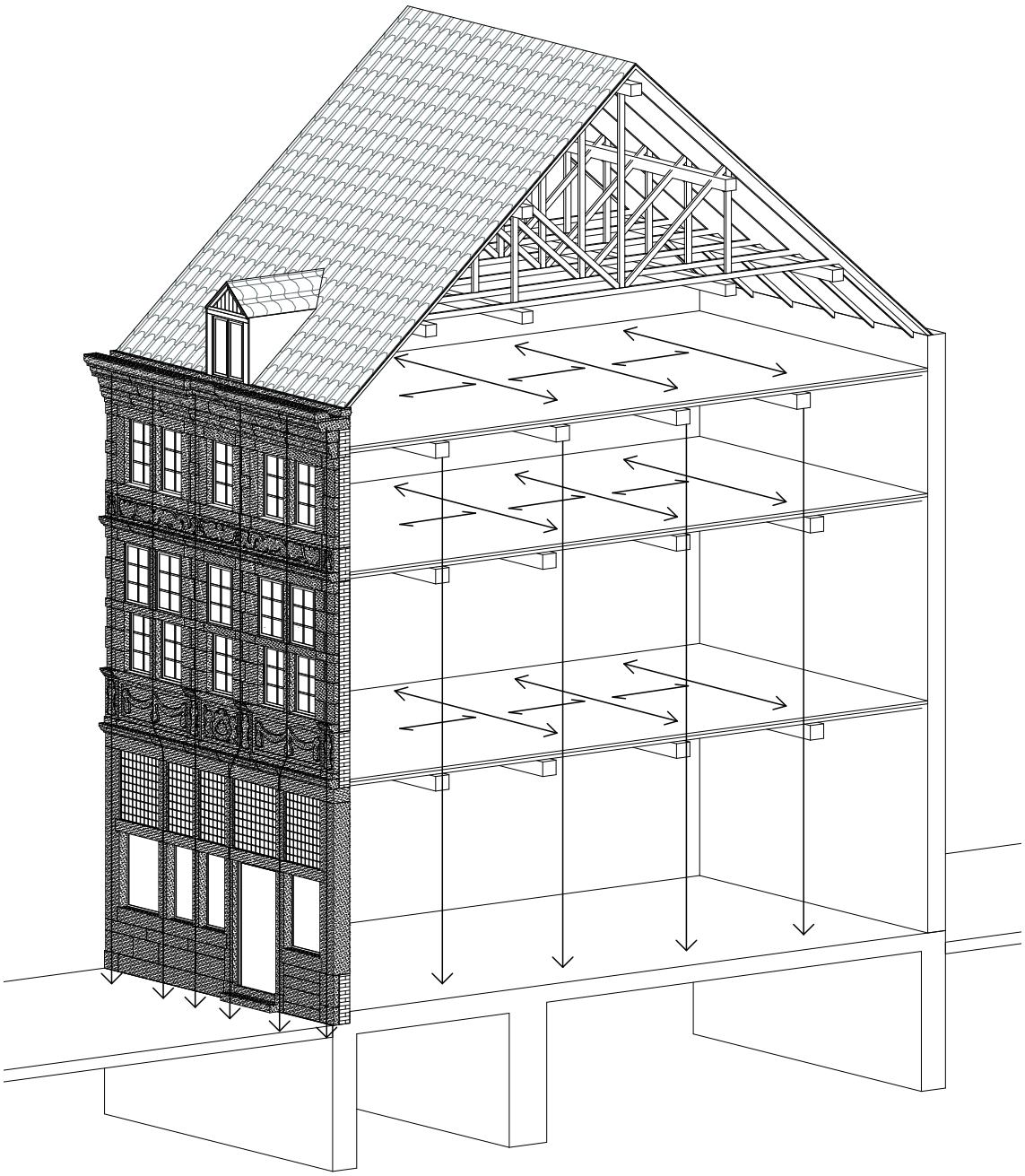
Picture Stokstraat 28-30 (by Rijksdienst cultureel erfgoed)



Section



Exploded View



Mechanics

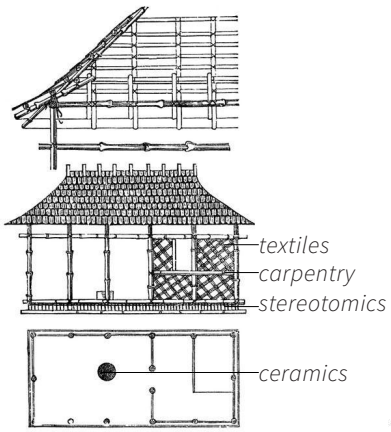
In Den Steenen Bergh as an example:

2. Ornament and tectonic representation

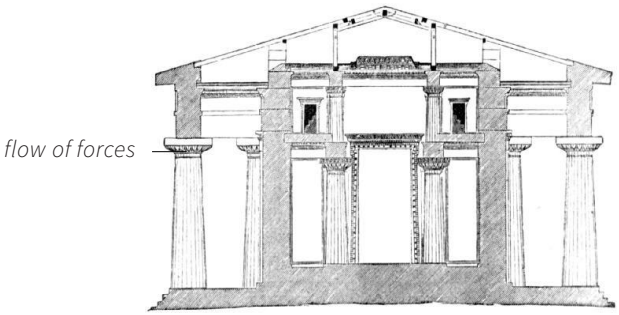
Now that we understand the structural working of the building and found out that this doesn't match the representation we will further research what this structural representation is about. This analysis is done by the use of two theory's about tectonics. The first theory is by Semper who states that the structure of a primordial hut represents the four main building techniques of architecture: stereotomics, carpentry, ceramics and textiles. The second theory is by Karl Botticher who states that in the Greek temples the ornamentation is based on a representation of the load in the building and the flow of the forces that are a result of this.

So when we look at the 'In Den Steenen Bergh' facade we can see how the ornamentation actually could be build up by these two theoretical layers. The first layer shows the differences between the different stones expressing the building techniques involved. In the drawings hereafter we see how the facade expresses these notions of stereotomics and post,lintel&infill. This layer also shows the inner structure by marking the position of the floors. Striking in this layer is also the notion of transposition which Semper explains as the transition of ornamental forms inherent to building with a material at another material. We can clearly see how the lower part of the stone facade is actually based on a wooden framework which also explains why it doesn't represent a continuation of the vertical load.

The second layer relates to the smaller details and shows how the forces could go through the 'In Den Steenen Bergh' facade when it was indeed carrying. For example the floors show a round surface as if they contain a pillow that is squeezed together by the forces. Also we can see how the ornamentation becomes more articulate and free at the places that are being carried and it even shows hanging forms at these places.

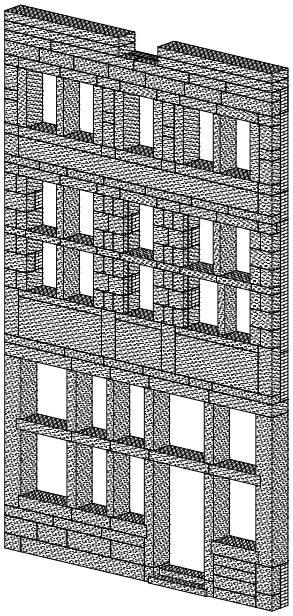


Gottfried Semper's Four Elements

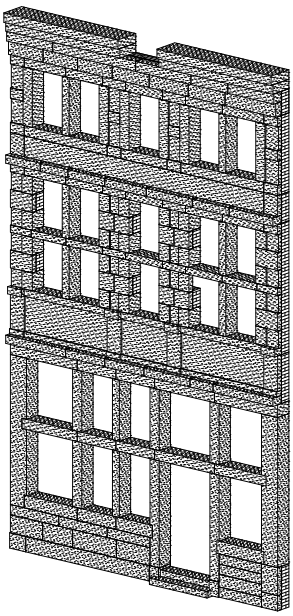


Karl Bötticher's Tektonik Der Hellenen

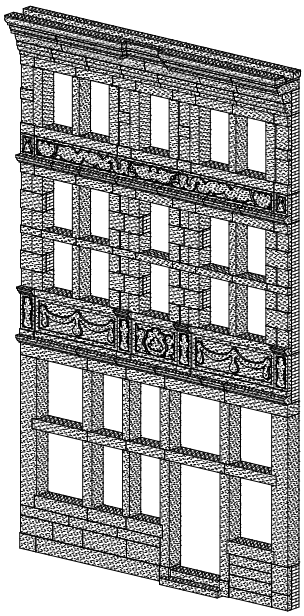
Layers of ornamentation



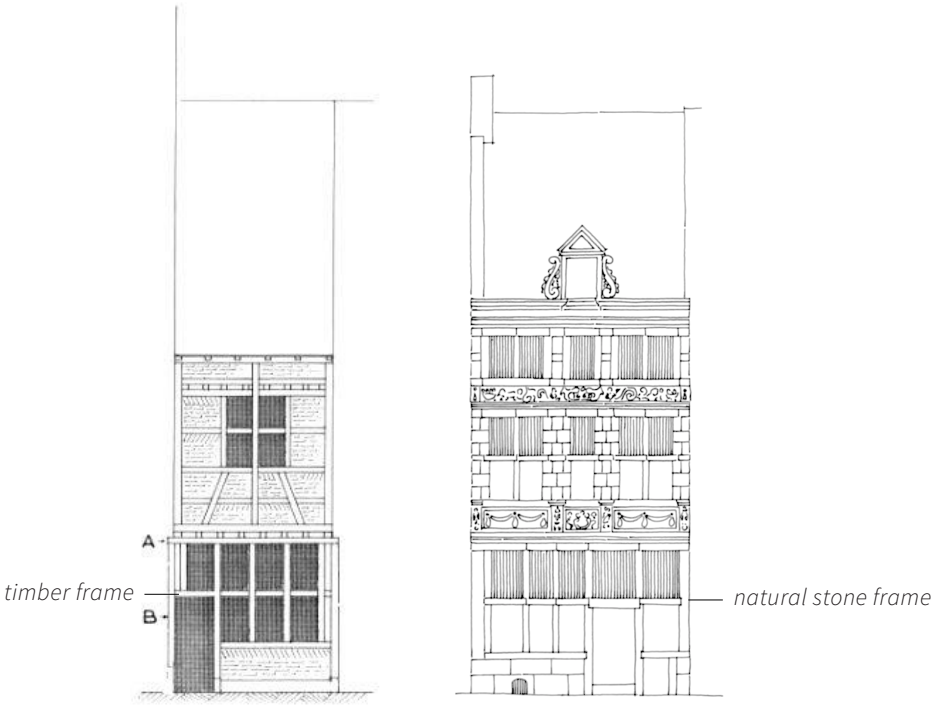
Without Ornament



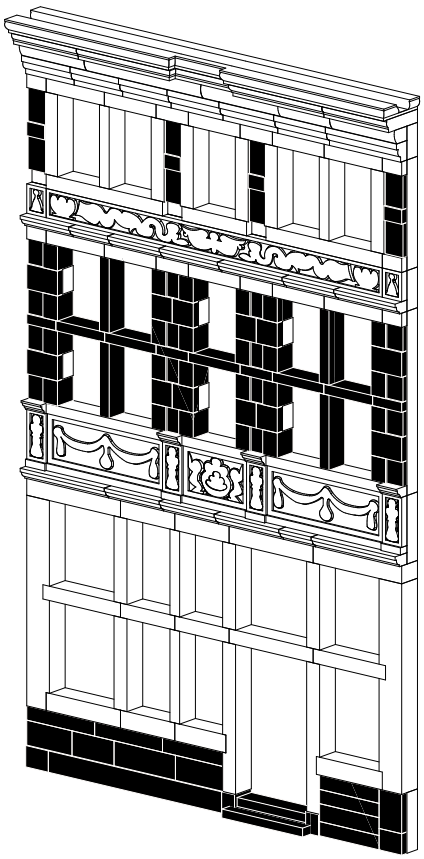
First layer of ornament:
exaggeration of the different stones expresses the different building techniques involved (Semper)



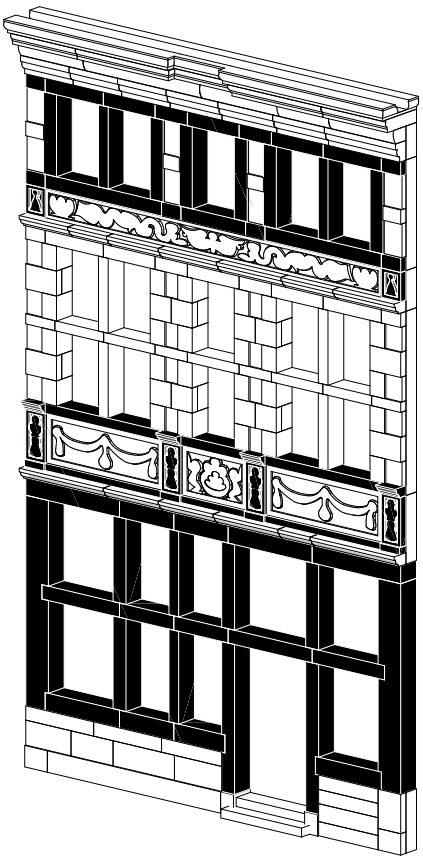
Second layer of ornament:
ornament is carved out to exaggerate the types of weight on the different stones. the stones that express that they are being supported are the most articulated (Böttticher)



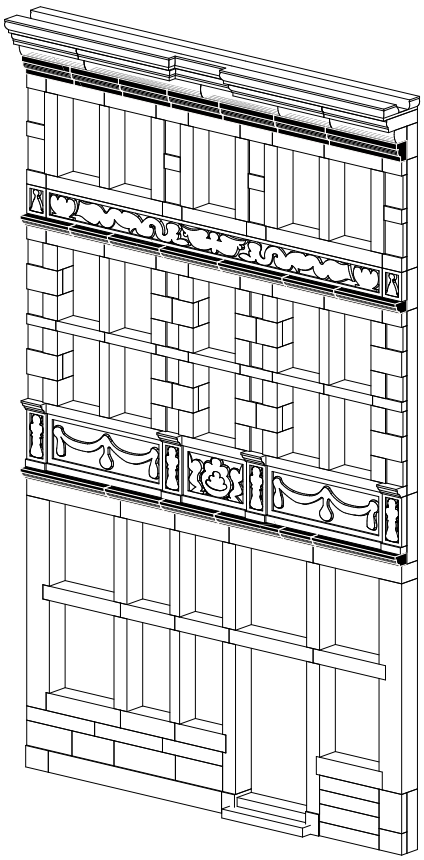
Transition of timber framework visual language to natural stone following Semper's theory of transposition



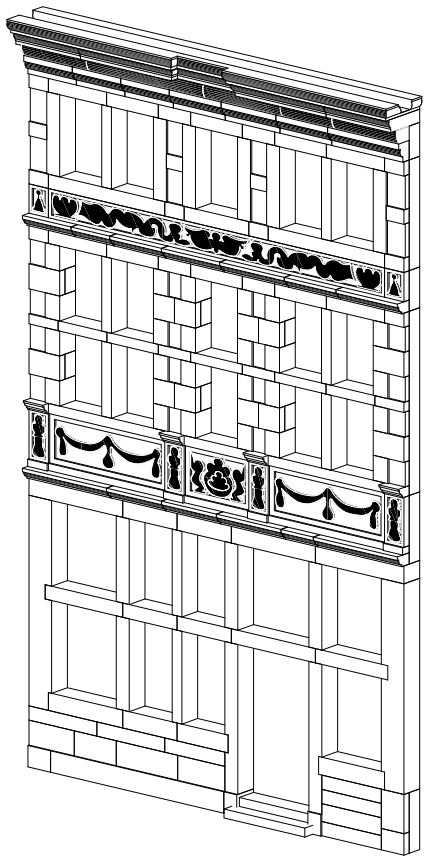
Expression of stereotomics



Expression of post, lintel & infill



Expression of inner structure



Expression of structural forces

Comparison

The following drawings show how tectonic means, that are abstracted from the Steenen Bergh analysis, can be found in a selection of the examples. The comparison tells us how all of these show structural workings that don't necessarily have to be there. Further more it explains which of these means are unique for the cases and which are part of a tradition. Regarding the unique features we see for example the narrowing of the columns in the city hall, the shift in vertical load transfer in the Steenen Bergh and the atectonic columns of the guardhouse. Regarding the common features we see different forms of expression of stereotomics, post,lintel&infill, inner structure and structural forces.

From these last features we can construct the 'typical' natural stone tectonic facade. This facade follows a tradition of combining the expression of stereotomics as well as post,lintel & infill whereas the first is more prominent at the down side of the facade and the second becomes more prominent in the upper parts. Moreover, it follows a tradition to mark the position of the floors in the facade making the spectator aware of the inner structure and the proportions of the interior spaces behind the facade. Finally it also has the layer of Bötticher where the ornaments show different amounts of load. The supporting elements seem to swell up whereas the supported elements look like they're hanging down. I think these features leave the spectator at the one hand with a sense of heaviness and permanence while at the same time also giving the impression of movement.

Facades

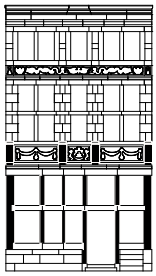
1. In Den Steenen Bergh

2. Stokstraat 11

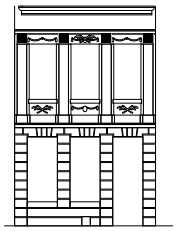
4. Markt 14

3. Stadhuis

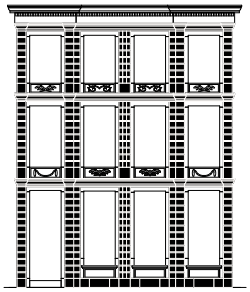
5. Hoofdwacht



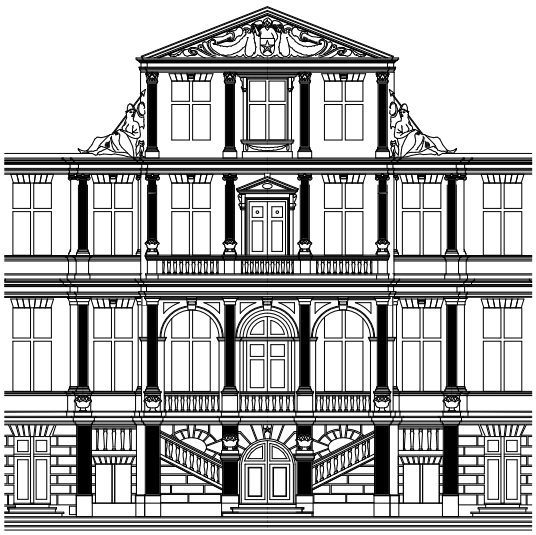
1. In Den Steenen Bergh
shift in vertical force re-mittance due to expres-sion of medieval timber framework



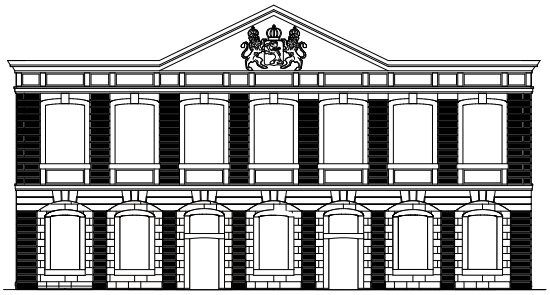
2. Stokstraat 11
expression of head-end inner beam due to the fact the house is on a corner



3. Markt 14
stereotomics start acting as posts and 'floors start acting as lintels

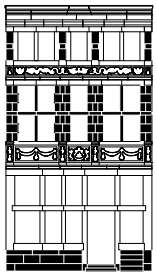


4. Stadhuis
decrease in column diameter according to height and less forces to cope with



5. Hoofdwacht
atectonic increase of 'column' width according to height contradicting the amount of forces to cope with

Expression of stereotomics



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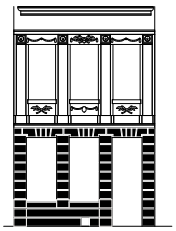
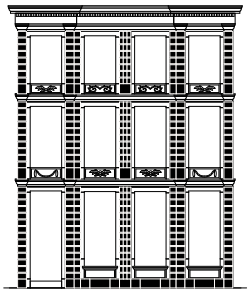
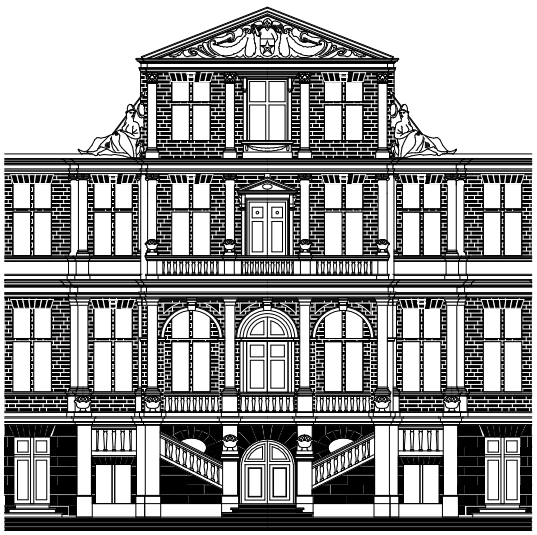


2. Stokstraat 11



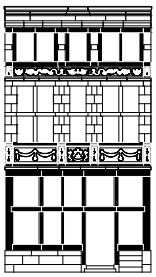
3. Markt 14



4. Stadhuis

5. Hoofdwacht

Expression of post, lintel & infill



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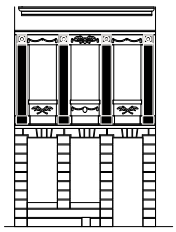
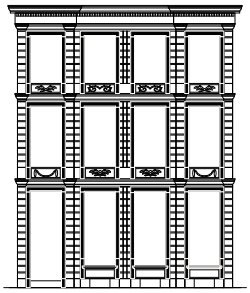


2. Stokstraat 11



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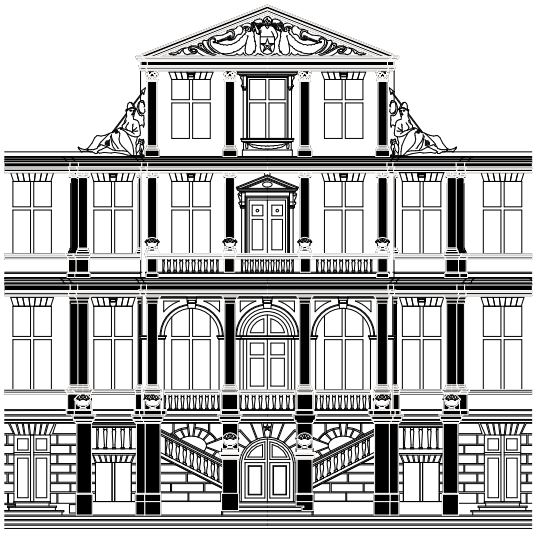
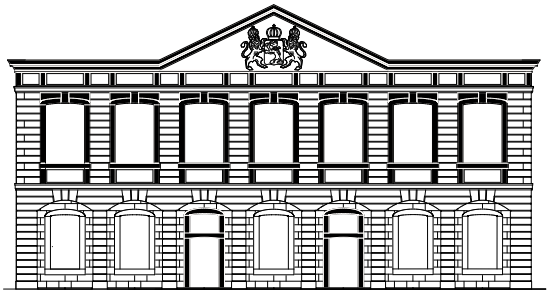
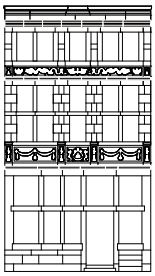


4. Stadhuis



5. Hoofdwacht

Expression of inner structure



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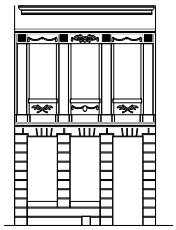
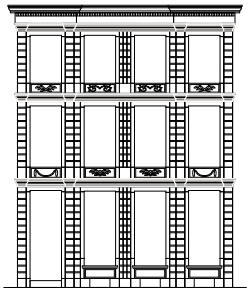


2. Stokstraat 11



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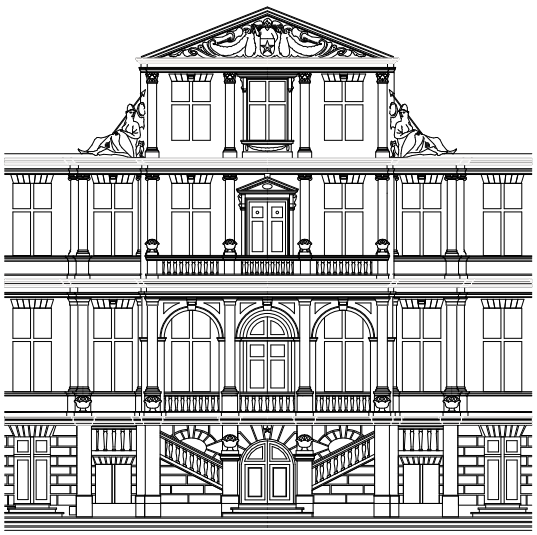
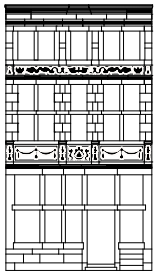


4. Stadhuis

5. Hoofdwacht

Expression of structural forces



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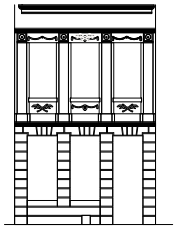

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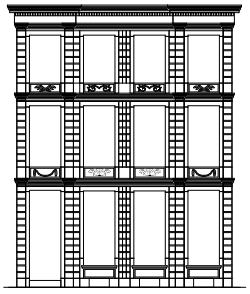

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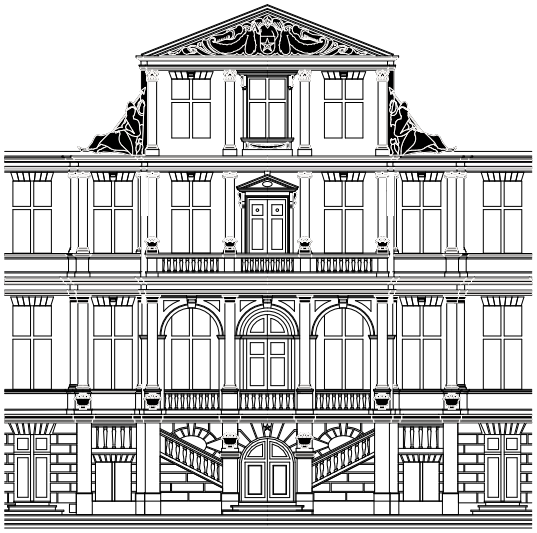
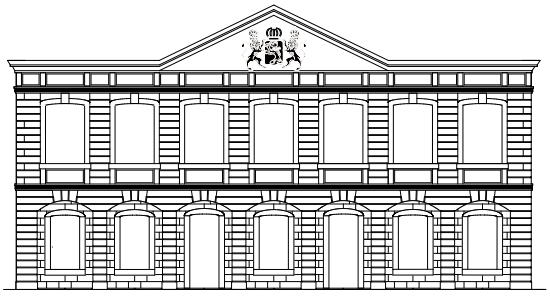
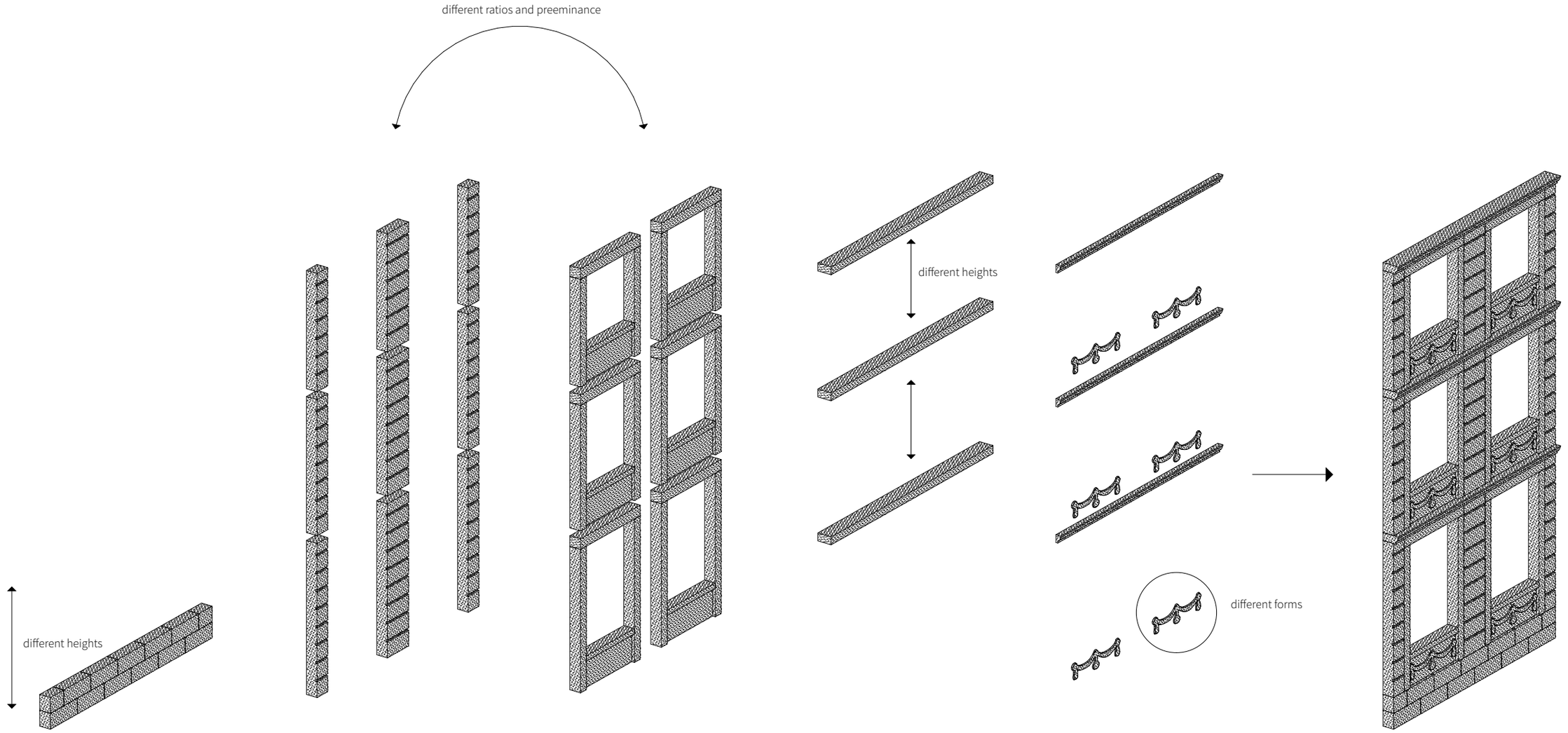


4. Stadhuis



5. Hoofdwacht



Expression of stereotomic plinth with stacked stones

Expression of stereotomic wall by means of fake joints

Expression of loadbearing post&lintel frame with supported infill

Expression of inner floors and spatial proportions

Expression of different types of structural forces

The common natural stone tectonic facade

The following page shows a blue limestone covered facade with the (according to the analysis) common tectonic features, next to an example of the more general facade type in Maastricht. From the comparison of the two we can formulate a couple of conclusions. First of all one could say that in Maastricht the expression of natural stone is primarily based on the stone's characteristics instead of on the real workings in the facade. Whether the stone is load bearing or used as cladding, in both cases it shows the heaviness of the material. Striking is also how the weight of the material becomes most strongly visible in the plinth of the two buildings representing the fact that the lower part s of the building have the most forces to cope with. In a way the stereotomics bind the building to the ground and give it a permanent character.

The second conclusion is that the expression of the stone can be seen as 'dressing up for a party'. Though this should not be seen as a costume party. This because the stone does not fully pretend to be something it is not, its not kitsch. At the other hand one could also argue that the stone doesn't represent a dressing at all but rather shows its naked truth. It becomes the body of the building. Looking at the buildings in Maastricht this could explain the fact that the natural stone facades look more public than the ones cladded in brick. The first type is fully naked whereas the second has a dressing around its intimate parts while at the places where the public realm meets the private the feet or lips pop out in the form of the plinths and window frames.

The last conclusions make use of these attitudes towards natural stone to say something about the Maastricht culture in general. First is that Maastricht can be seen as a heavy city. Second is that the culture of Maastricht can be characterized as pure rather than fabricated. Although it has a layer of acting, this is still bound to authentic values. Like 'dressing up for a party' Maastricht is trying to be the better version of itself. Finally this could also explain the fact that the city feels chique rather than kitsch. Maastricht should be compared not to a white, but to a red wine.

What I want to take with me from this research are the following research questions:
1. How to position my self to this natural stone tectonic tradition incorporating the heaviness and bodily experience of Maastricht
2, How to position myself to the tension between natural stone as a naked body and the dressing?

Comparison

Complete in blue limestone covered facade

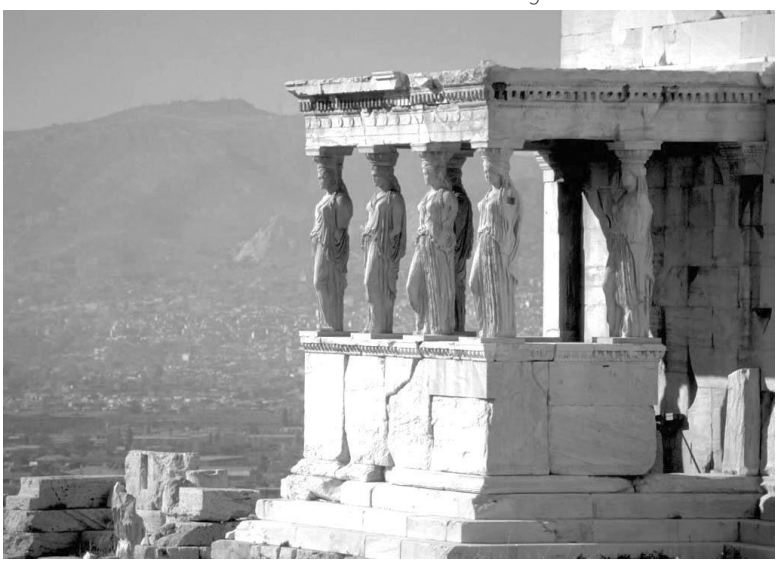
General facade type with blue limestone accents

Design interests

The city's tectonic tradition adressing its heaviness and bodily experience

Erice, Sycily (picture by author)

Tension between natural stone as a naked body which can be dressed or as dressing itself



Erechteion, Athens (picture by Sailing Issues)

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Pictures

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