

# Master Thesis Reflection

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## Studio

Transitional Territories / North Sea: Landscapes of  
Coexistence

Name / Theme

Main mentor	Jacques Vink	Design
Second mentor	Sjap Holst	Building Technology
Third mentor	Taneha K. Bacchin	Research

## Graduation Project

Name Make Food Great Again!  
Location Dordrecht, Netherlands

## Reflection

After six months of work on my thesis I finally arrived at an familiar urban and architectural scale which are not completely new and unfamiliar to me, as the scale of the North Sea certainly was. With this approach of familiar terrain I also finally understood how this research might result in a spatial configuration. I have to say that all the research in the beginning, especially on the large scale, more and more woke the desire for a rather practical design task and at a certain point I was seriously questioning how long its going to take for my project to finally become architectural. Now that I passed this point and I started with the design part in close relation to the research I feel like the extensive research in the beginning gives the project a strong foundation where a lot of now arising questions can be answered with. Thereby the Project develops with continuous switching from research and the applied design. On the one hand the design is a method of research in a way of creating an hypothetical scenario from which the feasibility, lucrativity and efficiency can be tested. On the other hand the design is based on several architectural caste studies from typological to context analysis. Moreover it found its justification as mentioned before in researching the larger north sea context and the phenomenon of over pollution due to agricultural enterprise and the recent development in agricultural technology with the 4th agricultural revolution.

The project combines the above mentioned scales and seeks for an architecture which is an architectural mashine prototype and social/urban enrichment at once. The chosen topic is a very recent one, the Nitrogen topic in the academic discourse came up around 2009 in the Planetary Boundaries Research. Claiming that the biochemical flows of Nitrogen and Phosphates are already beyond uncertain outcome which bring along high risks for the environment and eventually pushing climate change. These environmental concerns are closely related to environmental urbanism, which is sort of the core believe of the Transitional Territories studio.

Architecturally its interesting since the practice of clean meat production and vertical farming is is rather a biological or agricultural science topic. But to root both within an existing context, address its cultural, natural, social or any other urban measure makes its quite architectural. Also the question about how to make the whole production process experienceable for the public to not alienate the practice is an architectural question to be solved, specially since the “juck” factor became one of the core concerns of the leading scientists developing the technology of cell based meat. The project is relevant to the architectural scientific world, because the technologies I’ve been talking about have the potential to bring the 4th Agricultural Revolution. This means that first of all they are as recent that there has not been an architectural scientific work about clean meat factories. Same goes for vertical farms, they are also as new that there is not much

known or even researched about their implementation in the built environment especially the moment where these technologies and social urban life intersect. Another important reason for the relevance is the potential shift in land use, that these technologies could offer, which is directly connected to urbanisation. To be more precise with the research of this prototype one can straight forward assess whether or not these future facilities are a real feasibility to exchange for conventional agriculture in order to effectively tackle the pollution issues, through especially the Dutch cattle farmers and the resulting Nitrogen Crisis.

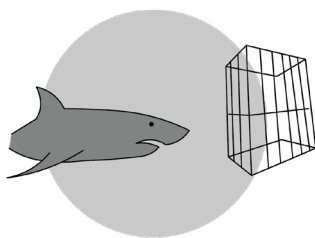
To get a grip on these technologies I reached out to scientists and industry working in the field of cell based meat and vertical farming in order to understand the status quo and realistic goals or benchmarks for each individual process. Through out this research I had trouble getting information since the topic is as recent that specially the industrial side but also the scientists seemed to be afraid of industrial espionage. While there were a few studies about the implementation and realistic improvement for vertical farming in the upcoming years to use, the research about the cell based meat to built a design foundation is in certain parts accumulative data from diverse sources. Thereby one can clearly see that the cell based meat scientists have become more optimistic about their technological future and its success in performance. A study from 2012 talks about a realistic 100 gram meat per litre nutrition solution as a production result, while now Kris Gasteratos, (founder of CAS - Cellular Agriculture Society) claims that leading scientists confidently say that 400 gram per litre would be reachable by 2040. This displays that there is a lot of improvement from the first burger made in 2013 by the Dutch company Mosa Meat costing 250.000 € to produce. Though this also concludes that the architectural prototype for the cellular meat factory is based on a scenario which realistically is feasible in 2040 from the current prognoses of the technological innovation. Further this uncertainty comes with a black box of technical machines which the architecture has to be able to accommodate which results in a rather lose fit program around the prominent and inevitable tanks used in the facility. For the vertical farm the technology is already there which fortunately lead to a rather tailored program of the facility.

I could have basically gone on for a lot more time trying to convince professionals to give me inside information which I could use to have a more detailed picture. Though also with the advice of my tutor I came to the conclusion that due to the speculative nature of the accumulated data there would always stay uncertainty about the prognoses. So to form a foundation for the design proposal and eventually define the program of the facility I stopped my attempts to interview at a certain point where I had sufficient sources. Once understanding the metabolisms of each process I was able to address the urge to create a circular metabolism which eventually became a four layered metabolism of water, matter, electrical-energy and thermal-energy. The location of the project was based on an assessment of certain parameters of strategic importance in these

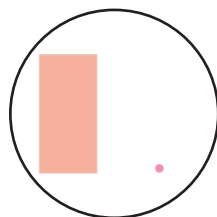
metabolisms. Firstly the location had to be in Netherlands because of the facility addressing the nitrogen pollution issue due to cattle and dairy farming. Thereby it also played a role to be close to the green heart which is the center of this pollution issue. It had to be taken into account that the sea level rise would in its worst case scenario not threaten the facility. Then the distribution of goods via ship is one reason which limited the possible locations to cities with an at least middle size port. The next important parameter for the site connected to the metabolisms is the immense need of water in the facility and therefore in a region with freshwater resources. And not to forget to address the social importance of the facility which eventually will bring a future industry to an area. All those issues distilled Dordrecht to be the perfect location for this prototype.

As soon as I placed the building in the context it became apparent to study the connection between the people and the facility, specially since one of the main research questions is about the role of the architecture in mediating between a new technology and its acceptance in society. Together with my Tutor I sharpened this research about the relation of the subject and the object with architecture as a mediator to four main characteristics about their hierarchy, majority, perspective and distance. It became clear which types are suitable for the facility. Till the end I had the desire to implement the type Shark Cage into the facility which fortunately did work out in the end. Its very distinct characteristics, specially its temporality, make in an interesting type to use.

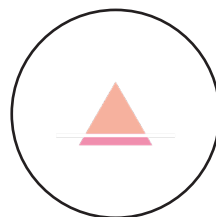
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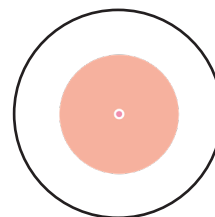
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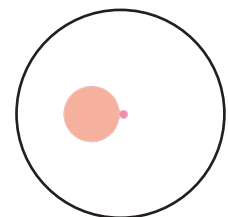
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Due to the symbiosis of machine and human interaction the form of the building follows its function with the credo of “No Soil, No Sun, No Slaughter” meaning that in order to perform the food production none of these are necessary. Though in certain occasions where human interaction takes place the building doesn't follow just the function it rather forms a symbiosis of urban, social and aesthetically reasons. The main urban form represents the typical block structure as found in the urban context of Dordrecht, but it differs in size and shape to introduce a new typology. A typology which is unfamiliar but familiar in shape with the circle in the square, where the circle is the element which distributes the matter through the facility as physical manifestation of the concept but also as the most efficient form. Metaphorically while designing I had in mind the research goal about reducing the utilization of the green heart which I then translated into the mass and the void. The void designed to be a representation of the Dutch landscape, purposely without program to be defined by the users. The mass accommodating the machine giving the opportunity for the void to be empty.

Looking back at my process I have to say that due to the big part of technical research, starting with the North Sea and later then technical processes, which were totally out of my field of knowledge, my main focus while designing was on making the machine work. I did it this way because of the unfamiliarity of the subject and the urge to meet the requirements of the machine. Because of this at a certain point the importance to be embedded in the urban fabric almost got overseen by myself. My tutors suggested to differentiate the industrial from the public spaces and lay an extra focus on the latter. The same applied for the diverse directions to approach the building which is becoming a major part of Dordrecht's water connection to Rotterdam. All this asked for refined and diverse spatial quality to arrive and stay for the different user flows which were studied in a Cullen's way of sequence drawings. The monumental structure is meant to be a distinct recognizable silhouette in the distance which leaves certain penetrations to unveil its function to the observer if one dares to have a look. Its almost introverted character translates from the urge to give distinct insights to the observer rather than exposing itself at first glance. Here the monumentality is broken down to a human scale, where the new reveals itself only to the curious researcher. Lastly the restaurant closes the cycle of production and sensual experiencing the 4th agricultural revolution. With this I wanted to weave the facility into the urban life.

To conclude I will reflect on my conceptual goals and their main critiques. I started this journey of research with ecomodernist ideas in mind which got tested and criticized a lot during external critiques. The almost religious resistance I encountered about whether or not there would be the necessity for those “detachments” from nature encouraged me in my belief in the topic. I saw it as proof of the sensitive observation from cell based meat scientists that society has to be introduced to the issues along food production and the advantages of these advancements. This thesis

is not a plea for ecomodernist believes, nor is it a plea for vegetarianism or veganism. I am aware of the ethical issues regarding the (eco-)modernist control over nature which historically we will all agree lead to climate change and relating natural catastrophes. As said I am not pleading for control over nature rather for a refined utilization of natural processes in order to compensate over pollution, which eventually once implemented will lead to less controll or influence on the environment. Centralization also always comes up where efficiency is addressed and the argument is mostly about the shift of power from many (in this case farmers) to an elite. The same issue applies here as for the other argument: the reality is already different. Its not anymore this untouched nature we all have in mind thinking about it. In the Netherlands every square meter is utilized/engineered landscape: Nature is where man wants it to be. And the reality of farming has also changed from the small quaint farms to a hyper utilized mega efficient industry. Meaning the elite already exists. And these mostly environmentalist romantic ideas about self sustaining organic farms etc. fails on reality, the believes that society can just go back to all these romantic historic ideas is a symptom from wealth expressed by the contemporary bourgeoisie.

## **Make Food Great Again!**