systematic aesthetics

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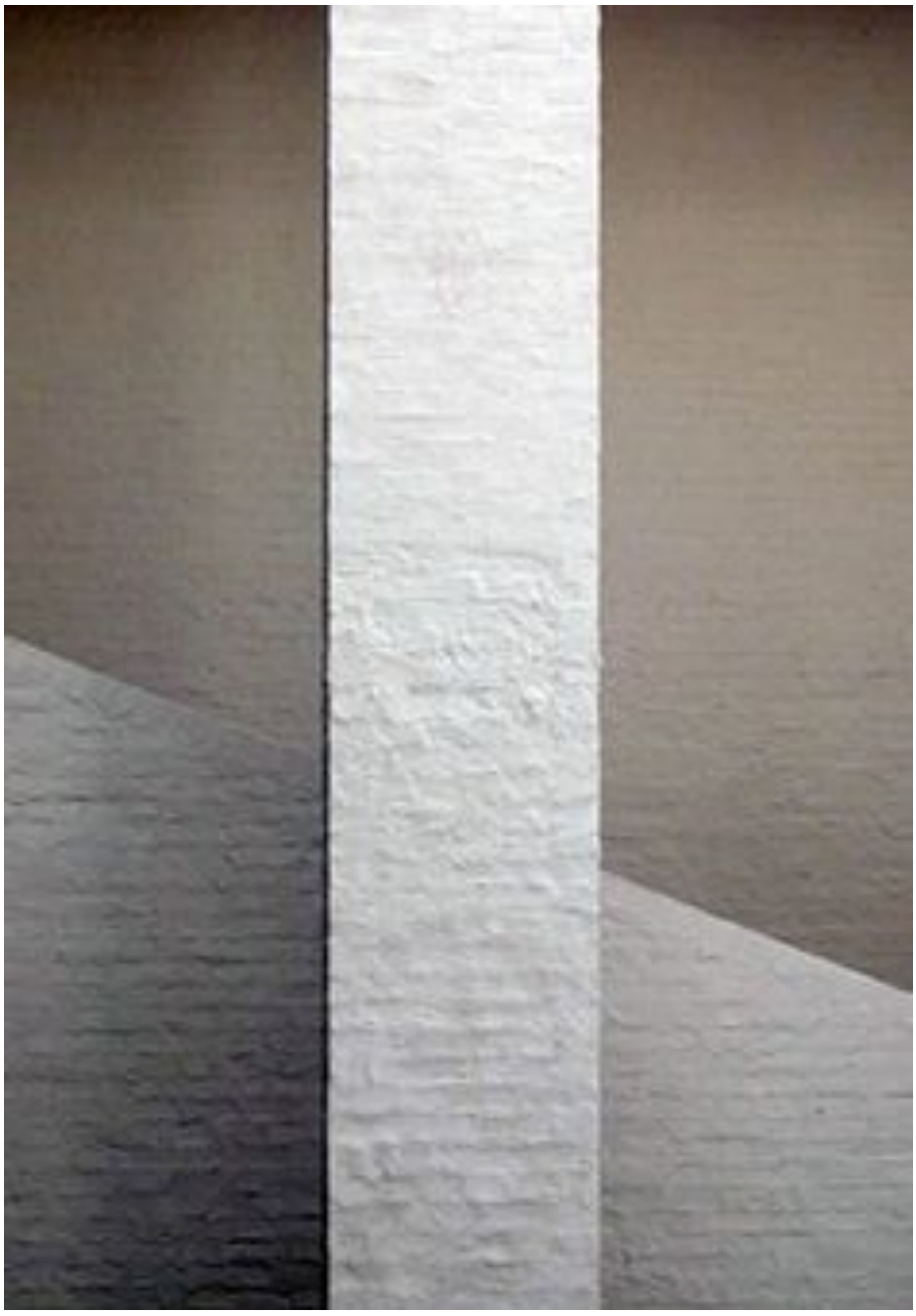

Systematic aesthetics //

> *"Genius is personal, decided by fate, but it expresses itself by means of system. There is no work of art without system."*[1]
> *Le Corbusier*

From Vitruvius and Alberti to Le Corbusier, architects have more than once tried to rationalise architecture by applying a system. Logics, often backed with mathematics could arguably bring the art of architecture to a new, perhaps even scientific level. The catholic priest and architect Dom Hans van der Laan believed architecture could only be read, if it interweaves our intuitive sensorial perception and the logical, abstracting intellect.[2] My final master project involves the extension of a building by Van der Laan, the Roosenberg abbey, a building on which he applied his systematic theories of the plastic number. Whilst designing on this project I tried to understand the basics of Van der Laan's methods, in order to see how this plastic number could be a design tool for new interventions involving his legacy.

In his 'Architectonic Space', Van der Laan presents the plastic number as the only possible means by which good architecture could be achieved.[3] I personally highly doubt that a rational system can form the only true basis of good architecture, but I do believe that a well applied system of order and logics can increase the readability of an art that is in first instance based on intuition. Consequently, my hypothesis is that a recipe for eminent architecture cannot solely be found in a rationalised system. Aesthetic quality is not the product of an objectified system, as intuition remains to fulfil a key role.

In this paper, I shall explain my position regarding the methodology of rational systematics in architecture such as Van der Laan's plastic number. Firstly, Van der Laan's theory on the plastic number will be shorty introduced by putting it in its historical context. Secondly, I will make the connection between his architecture and theory, after which I will put the theory of Van der Laan in the perspective of the architectural epistemes as discussed by Avermaete.

A Vitruvian obsession
In the oldest known treatise on architecture, De Architectura, Vitruvius sought to reconcile biology with architecture through the medium of geometry. Next to the famous three demands; 'Firmitas', 'Utilitas' and 'Vernustas', Vitrivius identifies 'Six Principles of Design'. These principles; order (*ordinatio*), arrangement (*dispositio*), proportion (*eurythmia*), symmetry (*symmetria*), propriety (*decor*) and economy (*distributio*), should form the origins of architecture. Among the six principles, proportion interrelates and supports all the other factors in geometrical forms and arithmetical ratios.[4] The

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[1] Le Corbusier, *l'Esprit Nouveau* (1919), cited by St. John Wilson (1988). *Architectural Reflections*. Washington. Butterworth. pp. 169
[2] Voet, C. (2016). *Between Looking and Making: Unravelling Dom Hans van der Laan's Plastic Number*. Architectural Histories.
[3] Idem
[4] Jones, Mark Wilson (2000). *Principles of Roman Architecture*. New Haven and London: Yale University Press. pp. 33–46.

interesting principle however, is symmetria. In ancient times this notion could best be understood as 'mathematical harmony' and measurable proportions.[5] The symmetria could be found in the human anatomy, where the different proportions interrelated through 'perfect ratios'. The face is, for example, 1/10 of the total body height and the whole head 1/8. Vitruvius argued these ratios could be found in the Greek classical orders. When the architecture followed the ratios of the human anatomy, people would perceive it as an aesthetically harmonious composition.[6]

About 1500 years later, Vitruvius' thoughts inspired Renaissance thinkers such as Alberti and Leonardo da Vinci. With his 'Vitruvian Man', da Vinci illustrated Vitruvius's proportion system. His drawing became the most famous rendering of the reconciliation of the body with 'perfect' geometry. Leon Battista Alberti was the first to adapt these ratios to architecture in his treatise De Re Aedificatoria.[7] Alberti believed architecture should be based on 'perfect' geometrical shapes, who related to each other in ratio's he found in nature.

Another Renaissance ratio system illustrated by Da Vinci would however become the most famous of all; the golden ratio. Based on the Fibonacci sequence, Luca Pacioli wrote his De Divina Proportione on the golden ratio in the human body and architecture. Da Vinci and Pacioli found the golden ratio in a variety of natural anatomies and compared the proportions of the human body to those of artificial structures, with examples from classical Greco–Roman architecture.[8] Pacioli believed the golden ratio had been on the origins of great works such as the Parthenon and the pyramids of Giza. Today, scholars argue the golden ratio can be found in a large number of architectural masterpieces, from the 8th century Borobudur stupas to the 12th century Notre Dame de Paris.[9]

It wasn't after the renaissance however that we are sure architects have systematically applied the golden ratio in their works, instead of it being a coincidental overlap with our intuitive aesthetical perception. The works of Alberti and Pacioli became guiding treatises for the centuries thereafter, not in the last place for neoclassical architects. In the beginning of the 20th century a renewed interest in rational systems arose by non–classical architects. In an era that was already displaying widespread fascination with mathematics as a potential source of universal truths, Architects such as Hendrik Petrus Berlage and Ludwig Mies van der Rohe were inspired by the new geometrical studies of Jan Hessel de Groot (1896) or Jay Hambidge (1920).[10]

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[5] Jones, Mark Wilson (2000). *Principles of Roman Architecture*. New Haven and London: Yale University Press. pp. 41.
[6] Idem
[7] Grafton, Anthony (2000). *Leon Battista Alberti: master builder of the Italian Renaissance*. New York: Hill and Wang, pp. 23.
[8] "*Divina proportione, after Leonardo da Vinci*". The Collection Online. Metropolitan Museum of Art, New York. Retrieved 15 march 2017
[9] Idem
[10] Voet, C. (2016). *Between Looking and Making: Unravelling Dom Hans van der Laan's Plastic Number*. Architectural Histories.

From the 1940's, in the long tradition of Vitruvius and Alberti, Le Corbusier did an own attempt to discover mathematical proportions in the human body and then to use that knowledge to improve both the appearance and function of architecture.[11] Annoyed by the disconnection of the metric system with the human body and intrigued by the imperial version, he developed Le Modulor. Besides these less prosaic complaints, the metric system in Europe was creating a range of communication problems between architects, engineers and craftspeople. The industrialisation of the building scene exposed a lack of dimensional standardisation as a serious impediment to efficiency in the building industry.[12]

Le Modulor system is based on human measurements, the Fibonacci numbers, and the golden ratio. Le Corbusier described it as a "range of harmonious measurements to suit the human scale, universally applicable to architecture and to mechanical things".[13] Just as Vitruvius, Le Corbusier overlays the human body with a pair of compasses and inscribes it with geometry as an allegorical connection between humanity and architecture.

The sizes and ratios derived from Le Modulor were however, despite being geometrically valid, problematic. Specifically, the divisions between the ideal dimensions were too widely spaced to be useful or practical.[14] Le Corbusier tried to solve this by introducing a secondary system derived from the primary one, but the complex construction of his proportional system was probably the main reason he hardly used it in his architecture. Le Corbusier's Modulor therefore represents a curious turning point in architectural history, as Ostwald states; "In one sense it represents a final brave attempt to provide a unifying rule for all architecture; in another it records the failure and limits of such an approach."[15]

Van der Laan's quest to a proportional system originates in the same willingness to rationalise, his approach is however fundamentally different. Whereas Le Corbusier, like Vitruvius and Alberti, retrieves his system from the human anatomy, Van der Laan starts with the human perception. By creating a proportional system, he aims to bond the surrounding space to the space of our experience.[16] Van der Laan believes we read (and therefore appreciate) our surroundings by relating the measurements of objects to each other. We intuitively place ourselves in relation with our surroundings and measure it. According to Van der Laan the fundamental function of architecture is established through its direct connection with the process of cognition: to make space readable.[17]

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[11] Ostwald, M.J. (2001). *The Modulor and Modulor 2 reviewed.* Basel, Birkhäuser.
[12] Idem
[13] Le Corbusier (2004) [First published in two volumes in 1954 and 1958.]. The Modulor: A Harmonious Measure to the Human Scale, Universally Applicable to Architecture and Mechanics. Basel. Birkhäuser.
[14] Ostwald, M.J. (2001). *The Modulor and Modulor 2 reviewed.* Basel, Birkhäuser.
[15] Idem
[16] Voet, C. (2016). *Between Looking and Making: Unravelling Dom Hans van der Laan's Plastic Number*. Architectural Histories.
[17] Idem

Through experiments Van der Laan found the most harmoniously readable proportion, at two ratios of 3/4 (the 'grondverhouding') and 1/7 (the derivative). With a complicated system, he derived several sequences of numbers that together would depict al proportions within the building. Since the system is based on an independent ratio instead of the human body, the proportions are in fact scaleless.[18] Together with his theory about superposition, the plastic number was very strictly applied in Van der Laan's buildings, making it a useful design tool. As Voet however states in her lectures, Van der Laan arguably started with an intuitive feeling of mass and space. In his letters to his brother Nico, Van der Laan writes he slightly deviates from his formula on the ends of the Roosenberg abbey facades, as he likes the corners to be a bit more 'fleshy'.[19]

Different from Le Corbusier, Van der Laan believed his system is the only possible way to achieve eminent architecture.[20] Le Corbusier understood the incapability of the Modulor and stated that ultimately 'our eyes are the judges'.[21] He only used the Modulor when it suited him and was quite open about this. Van der Laan in contrary took his methods strictly serious and believed they could be made exhaustive.

Objective phenomenology

Van der Laan's plastic number was, besides being a design tool, perhaps mainly a philosophical tool. The plastic number wasn't only a working method to create beauty, but the end goal of architecture itself. As Van der Laan stated; it was a way to guide the experience of space from a subjective to an objective foundation.[22] Even more than Le Modulor, the plastic number shows a phenomenological approach. The perception of the user, which is by definition subjective, is the starting point of Van der Laan's method. The ultimate goal has been to rationalise this fundamental subjectivity. He denied the possibility that our intuitive sense of aesthetics couldn't be objectified. In contrary to Choisy, who in his 'Histoire de l'Architecture' isn't interested in the actual built form, but merely in how it's experienced, Van der Laan tries to connect a morphological approach to a purely phenomenological one.[23]

Van der Laan's absolute devotion to characteristics of spatial disposition and form, shows that his methods are also highly morphological. Van der Laan seeks to find a base for morphological decisions by creating a system based on phenomenology. Van der Laan arguably tries to reach an objective phenomenology. This

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[18] Voet, C. (2016). *Between Looking and Making: Unravelling Dom Hans van der Laan's Plastic Number*. Architectural Histories.
[19] Voet, C. (01–03–2017, Waasmunster) Lecture; *Dom Hans van der Laan's Roosenberg.*
[20] Voet, C. (2016). *Between Looking and Making: Unravelling Dom Hans van der Laan's Plastic Number*. Architectural Histories.
[21] Ostwald, M.J. (2001). *The Modulor and Modulor 2 reviewed.* Basel, Birkhäuser.
[22] Voet, C. (2016). *Between Looking and Making: Unravelling Dom Hans van der Laan's Plastic Number*. Architectural Histories.
[23] Avermaete, T. (n.a.) *Architecture and Its Epistemes: Lecture Notes for Students.*

seems to be a contradictio in terminis however, as phenomenology is in origin, as described by philosopher Edmund Husserl, "the intuitive appreciation of phenomena as they are immediately perceived, without reference to scientific theory or prior learning."[24]

As Voet states in her lecture on the plastic number, it is questionable whether Van der Laan's approach is as objective as he likes to believe himself. When Voet repeated his experiments that formed the basis of his theories with her students, she hardly ever found the same results. [25] It seems therefore likely that Van der Laan's perfect proportions were merely the incarnations of his own intuitive sense of aesthetics, instead of an objectively justified rationalisation of architecture. Without a doubt however, Van der Laan's theories have proven to be a good instrument to reach outstanding architecture, but the plastic number remains an instrument, not a starting point.

Elusive intuition
The Vitruvian obsession with rationalising aesthetics and finding a recipe for an eminent composition, seems to be an objectless quest for an elusive solution. The existence of the golden ratio in ancient old structures cannot be proven to be designed and therefore is probably a coincidental overlap with our intuitive sense of beauty. As far as Le Corbusier went with his Modulor to find an anatomy based system of proportions, even he had to admit that ultimately such a system cannot exhaustively produce the ingredients for good architecture; 'the eyes remain the judges'.

The buildings of Van der Laan are very clearly a reflection of a well-reasoned phenomenological theory, but the foundations of the system seem to rely on subjectivity. The undeniable subjectivity shows that although a systematic approach to design can definitely be a useful instrument to reach excellence, it will always rely on aesthetical intuition to reach outstanding architecture.

[24] Stanford Encyclopedia of Philosophy, retrieved 19-05-17 from https://plato.stanford.edu/entries/phenomenology/
[25] Voet, C. (2016). *Between Looking and Making: Unravelling Dom Hans van der Laan's Plastic Number*. Architectural Histories.