The Aesthetics of Proportion in Hans van der Laan and Leon Battista Alberti

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Benedictine monk Dom Hans van der Laan (1904-1991) was a scholar, theologian, philosopher, artist, architect and an important source of inspiration for Dutch architecture of last century. He erected few buildings and established his architectural theory by teaching and reporting his lessons in books and essays. Among the several writings bequeathed by Van der Laan, the book *Architectonische Ruimte, Vijftien lessen over de dispositive van het menselijk verblijf* stands out. Indeed, it is not only a collection of lessons, but it is a true treatise of architecture. Moreover, it is not by coincidence that Van der Laan in his writings referred only to Vitruvius rather than to the other architects and scholars he might have quoted. He aimed at establishing a theory of architecture on how buildings should be built. Van der Laan took Vitruvius' *De Architectura Libri Decem,* the first treatise on architecture inherited from antiquity, as a reference on the origin of human making. He recognized in it the only available source to have access to the principles of classical Greek architecture. Indeed, Van der Laan focused his attention on meanings of ancient words – such as *eurythmia*, *symmetria* and *ordinatio* – rather than on postulates or assumptions stated by Vitruvius. He worked to lay new foundations for architectural practice just as did many important figures, in particular during the fifteenth century in Italy. Nevertheless, Van der Laan's theory has been mainly discussed in reference to Vitruvius' ten books or as a figure isolated from the history. This essay aims to move from this univocal and isolated reading of Van der Laan's work by proposing a comparison between the Dutch architect and the humanistic Florentine architect Leon Battista Alberti (1404-1472). The reason for this comparison lies in the many aspects that appear in the work of both Van der Laan and Alberti, particularly in the aesthetics of proportion, which embodies in the work of both architects a perceptive and cognitive value.

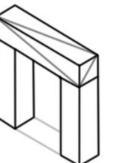## 1. *Van der Laan, Alberti and Vitruvius*

To begin, both Alberti and Van der Laan wrote a treatise on architecture directly referring to Vitruvius' *De Architectura*. Indeed, Alberti was inspired by Vitruvius in the composition of his *De re Aedificatoria,* but, like Van der Laan, he distanced himself from this reference by producing an innovative theory still valid today. As stated by Joseph Rykwert: «The essential difference between Alberti and Vitruvius is that the ancient writer tells you how the buildings that you may admire as you read him were built, while Alberti is prescribing how the buildings of the future are to be built» (Alberti [1998]: IX-X). Vitruvius wrote to record a past epoch, while Van der Laan and Alberti opened a new one. How they did it is another point shared by two architects.
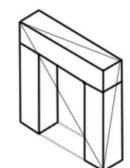
Van der Laan and Alberti were both scholars and philosophers before becoming architects. They designed their few buildings only at the end of their lives and dedicated the rest of their lives to the search for the essence of architectural practice. Van der Laan began building his most important architecture, the extension of the St. Benedict's Abbey in Vaals, at the age of fifty-two (1956) and completed it when he was eighty-two. At the end of his life he was involved in the design of the Jesu Moder Marias Kloster in Tomelilla, which was completed under the direction of his nephew and architect Rik van der Laan. Similarly, Alberti built the Malatestiano temple in Rimini, the Rucellai palace and the Santa Maria Novella church in Florence between 1450 and 1460, almost at the end of his life. After his death, he left the design of San Sebastiano and Sant'Andrea in Mantua unfinished. Both Alberti and Van der Laan perceived the importance of establishing a body of rules on which set up their architectural practice, and hopefully, the architecture of next generations.

In the act of laying the foundations of new architectural principles, both Van der Laan and Alberti made use of Vitruvius' six terms (*ordinatio, dispositio, eurythmia*, *symmetria distributio, décor*) ending up with the production of relevant terminological innovations intended to influence the following practice and theory of proportion in architecture.

Van der Laan began his *Het Plastische Getal* (1960) with a careful explanation of Vitruvian terms by proposing a translation directly from the Latin text *De Architectura*. He did not refer to past versions of the ancient book, but presented his own reading of the text. As an illustration, he completely reviewed the meaning of the term *eurythmia* by assigning it an active role, which was present neither in Vitruvian treatise nor in the following versions and critically readings of it. According to Van der Laan, eurhythmy is concerned with proportional ratios relating length, breadth and height of each

architectural element, while Vitruvius meant with the term the aesthetic pleasure that spectators feel when they are admiring a well-proportioned building. The semantic value that Van der Laan assigned to eurhythmy differs markedly from the conception Vitruvius had of the same term. Indeed, although according to Vitruvius eurhythmy «is achieved when the elements of the project are proportionate in height to width, length to breadth, and every element corresponds in its dimensions to the total measure of the whole», it is described by the ancient treatise as «an attractive appearance and a coherent aspect in the composition of the elements» (Vitruvius [1999]: 25). According to Vitruvius, eurhythmy is the result of symmetrical proportions and involves the precise moment of fulfillment consequent to the vision of the building. Indeed, in Vitruvius, eurhythmy does not contribute to the architectural composition, while in Van der Laan the role of eurhythmy is so important that symmetry could not even exist without it. Van der Laan describes symmetry as «the comparison of corresponding measures of different forms: length is compared with length, breath with breadth, and height with height. But the form of the squared mass (the form of the whole building, or of one of its components) as such is determined by the mutual proportions between its three dimensions, which are not symmetrical but eurhythmic: length is compared with breadth, breadth with height, and height with length. Symmetrical proportions enable us to determine the size of forms, by relating them to a form that acts as a unit of size; but eurhythmic proportions give us an insight, not into the quantity of form, but into its qualitative properties» (Van der Laan (1967: 99)[1]. Therefore, eurhythmy defines the shape of an individual architectural component, and symmetry determines the scale of the same component in relation to other elements (F.1).
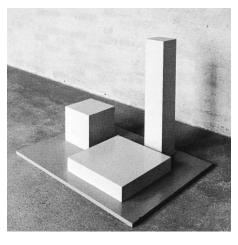
In the *Architectonische Ruimte,* symmetry and eurhythmy together bring into being a kind of "super-eurhythmy"*,* which Van der Laan expressed with the Greek word *thematismos*[2], probably borrowed again from Vitruvius[3]. *Thematismos* bears a likeness to the meaning of the Albertian *finitio*[4]. Indeed, it is a matter of superposition and juxtaposition of many eurhythmies and symmetries, which together achieve a perfect concordance of the whole structure. Breadth, length and height of each singular part are related one to another, generating symmetries. Van der Laan compared this final "super-form" to the human body: structures adopted in architectonic spaces (sitting, standing, lying) (F.2). With the word *thematimos* he activated a semantic migration, again similar to the one Alberti made with the term *concinnitas* (cfr. Proietti [2010]). Alberti borrowed the word *concinnitas* from Cicero and the oratory art in order to restate important paradigms of architecture. Similarly, Van der Laan chose the word *thematismos*, perhaps because the only one not compromised by the many interpretations of Vitruvian terms, to present an analogical connection between architectural composition and human experiential space. Both architects used words largely forgotten in architectural theory, or perhaps never used at all in the artistic field, to reaffirm original principles of architecture.

Moreover, *thematismos* and *concinnitas* share some semantic tangencies. Indeed, *concinnitas* means a completeness where nothing can be added or subtracted without

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[2] Van der Laan introduced the word *thematismos* only at the end of his life in a writing titled: *Een architectuur op basis van het ruimtelijk gegeven van de natuur* (1989), Hans van der Laan Archive OSB, Vaals. This text has been translated by Richard Padovan in *Instruments of Order* (cfr. Ferlenga, Verde [2011]: 194-198).

[3] *Thematismos* was mentioned by Vitruvius, even if with a marginal role, in the description of the concept of *décor*: «correctness (décor) is the refined appearance of a project that has been composed of proven elements and with authority. It is achieved with respect to function (*statio*), which is called *thematismos* in Greek, or tradition, or nature». Vitruvius (1999: 25). In addition, the word *thematismos* is an ornament of Gregorian chants. Most probably Van der Laan was aware of these manifold meanings of the word.

[4] As stated by Hanno-Walter Kruft, the Albertian *finitio* was the sum between the Vitruvian notion of symmetry and eurhythmy (cf. Kruft [1994]).

altering the achieved perfection (Alberti [1998]: 156). Similarly, *thematismos* means stability (*statio*)[5]. Both strive towards perfection of proportions.

This involvement of the Dutch architect in terminological matters is scarcely discussed, but it plays a relevant role in Van der Laan's work to establish and disseminate his theory. Van der Laan used the six Vitruvian terms to establish his theory because in those words he recognized a common knowledge rooted in the origins of architecture. He did much the same with mathematics. Indeed, as he himself stated, it is not necessary that architects know mathematics in order to apply or understand his theory. Van der Laan could even have limited the systematization of his theory to the act of naming the eight groups of size of the plastic number progression (minor element, major element, minor piece, major piece, minor part, major part, minor whole, major whole). He assigned a measure to each element not to give a precise dimensional prescription. Rather, he used mathematics as common knowledge to help architects to communicate their project and construction workers to realize it. In his *Architectonische Ruimte*, Van der Laan quotes the formula of the plastic number progression just once (1 + x = x^3), asserting that: «from an architectonic point of view the result of this cubic equation would tell us little. We must in fact make a distinction between the measure of a system and their expression by means of the plastic number. A mathematical calculation gives us only abstract numbers with many decimals, and we then lose contact with the concrete reality of the plastic datum» (Van der Laan [1967]: 99). The plastic number proportional system ensues from studies on human perception rather than from a mathematical formula or geometrical construction. It starts from the sense of sight, again recalling Albertian approach to architecture and its proportions.
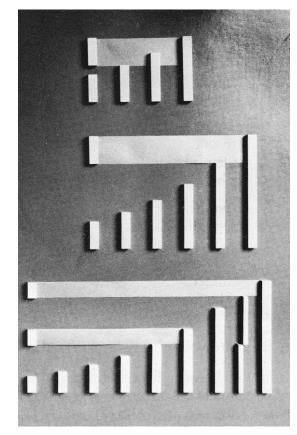
2. *Eye and Perception*

Effectively, both Van der Laan and Alberti based their proportional and architectural theory on an investigation of how the human eye perceives the world. According to Van der Laan, architecture, which consists of all human making, is a matter of establishing a relation between the human being and natural space. The sense of sight allows man to perceive and understand in the surrounding visible world sizes, proportions and shapes. On the other hand, Alberti favored the sense of sight among the other senses

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[5] It is interesting to point out that in the Abbey of Vaals, where Van der Laan spent most of his life, a corridor brings the name *stationnaire*, to indicate a place where monks stand to pray and meditate.

investigating the rules of perspective, which were the focus of Renaissance artists' studies and works.

The Dutch architect grounded his proportional theory, the *Plastic Number*, on the observation of nature and its phenomena (F.3). He studied modalities of perception, selection and classification by the human eye of surrounding forms. He started by making experiments and studying how man discerns and selects sizes by means of the innate typing aptitude of his brain. In one test he asked people to choose from a collection of sticks differentiated by length all those that belong to the same group of size. He observed that test subjects were inclined to categorize similar size-groups by shape and number of components. In another experiment Van der Laan tested the ability of test subjects to mark with a line the middle point of a fifty centimeter-long card. He witnessed the repetition of an error of about half a centimeter. He discovered that our limited mind does not allow us to perceive the smallest differences among sizes. Although we may recognize forms similar in size, we cannot measure forms in their tendency to infinity. Van der Laan concluded that our intellect is able to discern sizes, select them into groups of size and use the them to build an order intelligible to our mind. Quoting S.J. van Embden, Van der Laan sought «the structure, the natural grammar, of that recognizable language of forms understandable by all those who have eyes to see» (Van der Laan [1967]: VIII). The plastic number proportional system is the result of these experiments. Indeed, it cannot be described as a simple numeric progression, because every measure of the system represents a group of measures recognized by human eye as more or less alike in size. Van der Laan founded his theory on a distinction between what he called "discrete quantity" (how many?) and "continuous quantity" (how much?) (Van der Laan [1967]: 46). with the intent to make visible forms and their limitlessness knowable. The plastic

number represents the encounter between the discrete quantity (the act of counting) and the continuous quantity (the act of measuring).

Alberti dedicated his *Ludi rerum mathematicarum* (1450-1452) on the art of measuring by seeing. Here he illustrated methods of measuring the natural and built environment in the perspective framework. He invented measurement tools (*finitorium, exempeda*)[6] in order to investigate forms quantitative properties, going beyond the mere act of counting. As Van der Laan, he explored the limitlessness of nature. The Albertian emblem of the winged eye, borrowed by the Egyptian *Horus* eye, symbolizes exactly this tireless exploration which continues even after earthly life (F.4). Indeed, the winged eye, surrounded by a bay necklace, is provided with wings, which represent an afterlife journey towards the knowledge of the true essence of nature. Alberti associated the emblem with the writing "quid tum"[7], which, quoting Robert Tavernor,

"would suggest that everything can be grasped by the applied intellect, that there is nothing that endeavor cannot accomplish" (Tavernor [1998]: 32). The albertian winged eye is the eye of mind.

In Alberti's theory, the connection between eye and mind receptive skills was most probably helped by the importance acquired from science during Renaissance. Indeed, at that time science became the assumption that the world can be understood by human reason, a mechanism that works under a limited set of rules. Ways of perceiving the real world were understood as the direct cause of perceptive aptitudes ruled by the mind and conveyed by the eye. According to Alberti there was no difference between objective proportions and perspective laws, which rule the subjective impressions of buildings.

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[6] As explained by Alberti in *De Statua*, The *finitorum* is a disk that has six equal divisions (degrees), each of which subdivided in six minutes. A movable *radium,* divided in degrees and minutes, rotates from the center of the disk. Once placed on the top of the subject, the *radius* measures the parts of the body. The *exempeda* records the relationship of the parts of the body as proportions, making possible the comparison of bodies of varying heights. It is divided in inches and minutes.

[7] *Quid tum* is a motto of the Ciceronian rhetoric (what than). The emblem of the flying eye is drawn on the coin realized by Matteo de Pasti for Sigismondo Malatesta (1446).

The sense of eye became the sense capable of establishing a coherent connection between the limited human mind, with its perceptive aptitudes, and the objective reality of the observed form. Following Brunelleschi's perspectival studies, Alberti understood how laws of perspective are themselves ruled by proportion and that the eye has not only an inclination to perceive proportion: it perceives the world proportionally as well. This assumption was supported by the discovery that Brunelleschi made of the repetition of similar proportioned triangles in the optical pyramid which joins the perceiver subject and the perceived object (cfr. Wittkower [1978]: 126).

Although Van der Laan did not deal with laws of perspective in his architectural theory, his plastic number theory affects the three-dimensionality of architectonic space. According to the Dutch architect, the repetition of similar proportioned forms helps the spatial interaction between building and spectators, directing their movements, suggesting hierarchies among forms, and making objects and their morphological composition accessible by human mind[8]. The *morphoteek*, one of the plastic number tools, collects among its 120 three-dimensional forms different groups of similar elements which, once applied to building construction, contribute to the legibility of the entire structure during its spatial experience[9]. Quoting Peter Hugh Sholfield, the human eye «possesses a remarkable power of recognizing the relationship between objects having the same shape. It can exercise this power whatever the distance of the objects, and to a large extent it can overcome the distortion caused by viewing the objects from different angles» (Scholfield [1958]: 7).

Aristotle wrote that in the case of the senses «it is the mean that has the power of discernment» (Aristotle [1907]: 423 b 26). The sense of sight, as other senses, is a mean of discernment of the surrounding visible world. According to both Van der Laan and Alberti it is strongly connected to the mind. External information, extracted from objects, are discerned, selected, categorized, and re-elaborated by intellect in order to make them accessible and intelligible to human mind. Quoting Pliny, a source for Alberti, «the mind dwells in the eye, for we see by the mind and discern by the mind»[10]. The act of seeing is at the same time physical (sensing) and intellectual (understanding). As we will shortly present, this connection established by Van der Laan and Aberti

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[8] Plastic number proportional system owns a "cognitive value" (cfr. Proietti [2015]).

[9] The plastic number tools are divided in *abacus*, triangle of forms and *morphoteek*, (cfr. Van der Laan [1977]: lesson X).

[10] Pliny, the Elder (1855: XI. Liv, 145-146), cfr. Summers (1987: 136).
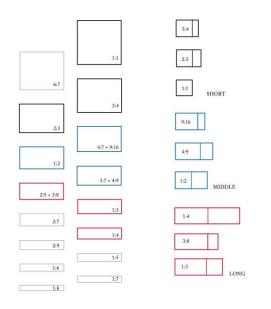
between eye and mind ended up in a reinterpretation of the values of proportion for both architects.

3. *Values of proportion*

Proportion had been the focus of both Van der Laan and Alberti's architectonic research. Both developed a proportional system: Van der Laan worked on the limits of the human eye, synthesizing them in a progression he called the plastic number. Alberti associated spatial ratios with those of music stating new ways to perceive architectonic space through commensurable ratios of small whole numbers.

Alberti divided possible areas to build spaces in three categories, in turn divided into three subcategories: short areas (1:1; 2:3, *diapente* or *sesquialtera*; 3:4, *diaterasson* or *sesquitertia*), middle areas (1:2, diapason; 4:9; 9:16), long areas (1:3, *disdiapasondiapente* or triple; 3:8; 1:4, *disdiapason* or quadruple). As stated by Maria Karvouni, Albertian short areas are musical consonances of the square (as well as musical consonances in themselves), middle areas are musical consonances of short areas, and long areas are musical consonances of middle areas (cfr. Karvouni [1994]: 282-291). Each proportional ratio of areas is the result of a precise system, which owns high additive properties. Indeed, each middle area is also the sum of two short areas, and therefore the sum of harmonic consonances. Similarly, long areas can be read as the sum of short and middle areas as well. Like Alberti, Van der Laan considered the mean of the sum a valid tool to generate a multiplicity of proportional ratios. Indeed, the plastic number system possesses high additive properties, because the sum of two consecutive measures in the system is equal to the following measure, skipping over one.

Moreover, all proportional ratios used by Alberti are traceable in Van der Laan's plastic number system, which is divided in authentic and derived measures. The authentic system is composed by the following ratios: minor element, 1:7; major element, 1:5; minor piece, 1:4; major piece, 1:3; minor part, 3:7 ($\cong$ 4:9); major part, 4:7 ($\cong$ 9:16); minor whole, 3:4; major whole, 1:1. The derived system is listed as below: minor element, 1:8; major element, 1:6; minor piece, 2:9; major piece, 2:7; minor part, 2:5 ($\cong$ 3:8); major part, 1:2; minor whole, 2:3; major whole, 6:7 (F.5).
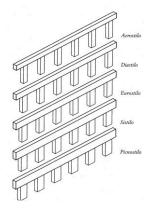
This means that there is a strong connection between plastic number system and musical consonances. According to Both Van der Laan and Alberti, a certain knowledge of music is important for architects' education[11]. Indeed, even if there is not a physical resemblance between the two arts, returning to their constituent principles, a meeting point does exist (cfr. Proietti [2012]: 277-283).

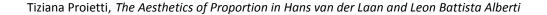In one of his lectures at the *Cursus Kerkelijke Architectuur*, Van der Laan presented a comparison between music and architecture. He compared the construction of a piece of music with the rhythm of a colonnade, again referring to Vitruvius, and at the same time alluding to the Renaissance interpretation of the five Vitruvian intercolumniations (*picnostilo, sistilo, eustilo, diastilo, areostilo*) (F.6). Both music and architecture are characterized by the sequence of elements and intervals, which are static in architecture and dynamic in music. Both of them are expressed through proportional relationships between dimensions, respective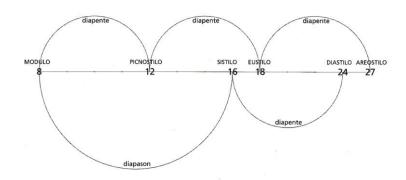ly articulated in time and space. Like Alberti, Van der Laan was mainly interested in the disposition and spaced out articulation of masses that delimit the architectonic space.

[11] «Een zekere kennis van de muzikale structuur is dus van groot belang voor een architect die in de grondslagen van zijn vak wil doordringen». Van der Laan (1951). Alberti describes the figure of the erudite artist and scholar in particular in his *De Iciarchia*, book 1. The *ingegnum* (intellect) must be cultivated by studying mathematics, music, poetry and all arts.
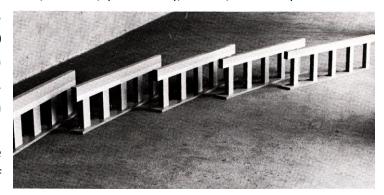
Vitruvius assigned to each intercolumniation a ratio based on how many times the diameter of the column can be counted in the interval between two columns. He did not specify proportional ratios for the intercolumniations and left the size of *areostilo* rather vague (more than three columns). The credit for this task belongs to Alberti, who listed all proportions of each intercolumniation in relation to musical consonances: *picnostilo*, 3:2 = fifth (1 column and 1:2); *sistilo*, 2:1 = octave (2 columns); *eustilo*, 9:4 = fifth of fifth (2 columns and 1:4); *diastilo*, 3:1 = fifth of octave (3 columns); *areostilo*, 27:8 = fifth of fifth of fifth (3 columns and 3:8) (F.7) (Napolitano [2006]: 367-370). Van der Laan stated proportions for intercolumniations as well by attributing to the size of the column the value of the minor element of the plastic number (100): picnostilo, 265:100 (1 column and 1:2); *sistilo*, 308:100, (2 columns); *eustilo*, 351:100 (2 columns and 1:4); *diastilo*, 408:100, (3 columns); *areostilo*, 465:100 (more than three columns) (Van der Laan [1983]: 141). The five Vitruvian intercolumniations correspond to five consecutives measures of the plastic number system (*picnostilo,* minor part derived; *sistilo,* minor part authentic; *eustilo,* major part derived; *diastilo,* major part authentic; *areostilo*, minor whole derived). This means, according to Van der Laan, that Vitruvian intercolumniations are nothing other than consecutive groups of size discernable by human eye (F.8). The *eustilo*, which Alberti recognized as the most harmonic one, being in the middle of the five intercolumniations, owns and

synthetizes the properties of other orders[12]. Van der Laan used the *eustilo* in the church of St. Benedict's Abbey in Vaals, designing intervals between columns on a rectangle of 3:4 proportion (F.11). According to Van der Laan, 3:4 – the fourth in music – is the "fundamental proportion". It is the ratio from which the plastic number system is generated.
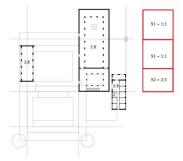

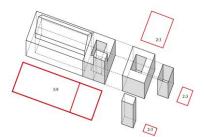It is interesting to point out an architectonic example of the application of the proportion 3:4, which once again links Van der Laan to Alberti. Van der Laan used the proportion 3:8 for the ground plan of the church of St. Benedict's Abbey as well as for its gallery and welcoming house (F.9). The proportion 3:8 belongs to the Albertian system as well. Indeed it is the second long area, a *sesquitertia* of the first middle area (L2 = M1 + 1/3 M1 = 4:3) and the geometric sum of two third short areas (3:4), but also the geometric sum of the second short area (2:3) and the double of the first short area (1:1), (L2 = S3 + S3; L2 = 2 S1 + S2) (F.10). Therefore the ratio 3:8, which has been long discussed by scholars of Van der Laan's theory, can be read as the geometric double of the "fundamental proportion" (3:4).
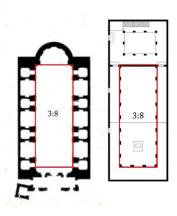

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[12] The architectural treatise of Van der Laan is underpinned by the Benedict temperance to seek moderation in all things: «Not too little, not too bing; not too long and not too broad; not too thin and not too thick; not too open and not too closed; not too dark and not too light». Van der Laan (1985: 83). This moderation calls to mind the concept of *moderatio* as expressed by Alberti in his *De re Aedificatoria*.

In addition, the ratio 2:3, in the albertian system a possible addend for the 3:8 ratio, represents in St. Benedict's church the plan of the atrium (F.12). Moreover, dividing the remaining area of the church (3:8 – 2:3) in two Albertian short areas (1:1), the axis on which the monument is placed will clearly appear finding a specific position in the whole structure. Strikingly, a similar proportional scheme is traceable in the plan of St. Andrea in Mantua by Alberti[13]. Indeed, here, as in the Vaals abbey, the central space of the church matches the long area 3:8. The central nave corresponds in both the churches of St. Benedict and St. Andrea to the second Albertian long area (F.13).

Evidently there are many ratios and principles belonging to both Alberti and Van der Laan's proportional theory. Van der Laan, like Alberti, was mostly interested in morphological qualities of proportioned architectural elements, called to satisfy human sensorial and intellectual needs. Both favored particular combinations between solids and voids as the main vehicle for the construction of architectonic spaces, which come into the world thanks to the act of delimiting a piece of natural space. Quoting Alberti, «a row of columns is nothing other than a wall that

has been pierced in several places by openings. Indeed, when defining the column itself, it may not be wrong to describe it as a certain, solid, and continuous section of wall, which has been raised perpendicularly from the ground, up right, for the purpose of bearing the roof» (Alberti [1998]: 25).

Conclusion

Scholfield, stating values of proportion, expressed himself as shown below: «The choice of any particular shapes in architectural proportion need not, therefore, be explained by the supposed beauty of the shapes themselves. It may simply be due to the fact that certain groups of shapes can be used more readily than others to build up a pattern in which order and economy of form are apparent to the eye. The reason that certain
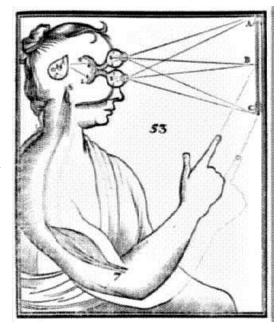
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[13] For a survey of Sant'Andrea in Mantua by Alberti see Tavernor (1998).

groups of shapes are more suitable for this purpose than others is mathematical. They can be best understood not geometrically but analytically, by reducing the problem from two or three dimensions to one» (Scholfield [1958]: 7). Both Alberti and Van der Laan seem to have shaped Scholfield's assumption through proportional systems and buildings.

According to Alberti there is a strong connection between eye and mind in the perception of *concinnitas*: «the very same numbers that cause sounds to have concinnitas, which are so pleasant to the ear, can also fill the eyes and mind (*oculi animusque*) with wondrous delight» (Alberti [1998]: 305). Indeed, when Alberti speaks about beauty he does not refer merely to the aesthetic value of visual arts, but he introduces a connection between an innate "reasoning faculty" of the mind and the perceived gracefulness. In his *De re Aedificatoria,* Alberti states as follow: «When you make judgments on beauty, you do not follow mere fancy, but the workings of a reasoning faculty that is inborn in the mind» (Alberti [1998]: 302). According to Alberti «beauty is a form of sympathy and consonance of the parts within a body, according to definite number, outline and position, as dictated by *concinnitas*, the absolute and fundamental rule in Nature» (Alberti [1998]: 302). It concerns the legibility of architecture (F.14).

Van der Laan did not frequently use the word "beauty" in his writings. According to him, beauty can possibly result from the encounter between the morphological qualities of the building and the human intellect (Van der Laan [1960]: lecture XIII. However, it is not the final goal of architecture. Rather, beauty may be better illustrated as the concordance between the intelligibility of forms, provided with proportions, and the structure of the human brain. Therefore, beauty, just like in Alberti's theory, may be described as a feeling of pleasure caused by the total comprehension of the essential structure of the objects and its internal meaning. As stated by Robert Vischer at the end of the nineteenth century, proportioned buildings awake a sense of pleasure not

because of their mathematical ratios, but because they favorably conform to human brain perceptive structure (Mallgrave [2011]: 79).

Both Alberti and Van der Laan seem to suggest that beauty of proportioned forms is the result of an intellectual appreciation. How this is can be explained has been recently in part investigated by the field of neuroaesthetics, but further investigation is certainly warrented.

To conclude: Both Alberti and Van der Laan saw in proportion the fundamental principle of architecture to build up sensorial and intelligible forms, as a means to respond to the complexity of human existence.

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Illustrations

F.1. Scheme of the concept of symmetry and eurhythmy in Van der Laan, (drawing by the author).

F.2. Van der Laan H., the three forms of *thematismos* (sitting, standing, lying), (cfr. Graatsma, Naalden, [1982]: 20).

F.3. Van der Laan H., the plastic number proportional system, (cfr. Graatsma, Naalden, [1982]: 31).

F.4. Alberti, the winged eye, miniature of the Estense codex (VI, A 12), Estense Library, Modena.

F.5. Van der Laan H., the five Vitruvian order of columns, (cfr. Van der Laan, [1983]: 140).

F.6. Musical consonances and proportions of the five Vitruvian order of columns, (cfr. Napolitano, [2006]: 369).

F.7. Van der Laan H., models of the five Vitruvian order of columns, (cfr. Graatsma, Naalden, [1982]: p. 35).

F.8. Comparing proportional ratios in Alberti and Van der Laan: from the right derived and authentic measures of the plastic number and Alberti's short, middle and long areas, (drawing by the author).

F.9. St. Benedict's Abbey, Vaals (1956), view of the main façade, (photo by the author).

Fig.10. Proportions of St. Benedict's Abbey plan and comparison with the Albertian second long area (3:8), in turn divided in three short areas (1:1 + 1:1 + 2:3), (drawing by the author).

F.11. St. Benedict's Abbey, Vaals (1956), view of the central nave of the church, (photo by the author).

F.12. Axonometry of St. Benedict's church with proportions of the aula, the atrium and the bell tower, (drawing by the author).

F.13. Comparing proportions of St. Benedict's and St. Andrea's central naves (3:8), (drawing by the author).

F.14. Renè Descartes, *L'Homme*, 1662. Interaction between mind and brain during the act of perceiving a form in the perspective framework.