The Geometry of Vision: Hermann Maertens’ Optical Scale for a Deterministic Architecture

La Geometría de la Visión: la Escala Óptica de Hermann Maertens para una Arquitectura Determinista

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Abstract

In 1870s the German architect Hermann Eduard Maertens grounded his Optical Scale research on Hermann Helmholtz and Franciscus Donders’ works about the physiology of vision and engrained it in the tradition of Renaissance perspective and proportion theory’s applications to architecture and urban planning. This article describes the scientific core of his approach, in the context of a general revision of aesthetic enjoyment of artworks and a deterministic reorientation of human knowledge toward the industrial production; his elaboration of a triad of visual angles to determine size and organization of space according to visual targets; the diffusion of visual cones as a graphic tool to include perceptual values in the project; the immediate success of his formula among architects and urban planners but, at the same time, the critical reception of his static concept of urban perception; the means of transmission of his ideas in the XX century and their often unaware long-term influence on some postwar years researches.

Keywords
Hermann Maertens, Optical Scale, Visual Perception, Visual Planning, Science and Architecture, Perspective

Resumen

En 1870 el arquitecto alemán Eduard Maertens basó su investigación en Escala Óptica en los trabajos de Hermann Helmholtz y Franciscus Donders sobre la fisiología de la visión, injertado en la tradición de la perspectiva renacentista y en las aplicaciones en arquitectura y planeamiento urbano de la teoría de las proporciones. Este artículo describe el fundamento científico de este enfoque, en el contexto de una revisión general del disfrute estético de las obras de arte y una reorientación determinista del conocimiento humano hacia la producción industrial; su elaboración de una tríada de ángulos visuales para determinar el tamaño y la organización del espacio según objetivos visuales; la difusión de conos visuales como una herramienta gráfica para incluir valores perceptuales en el proyecto; el éxito inmediato de su fórmula entre arquitectos y urbanistas pero, al mismo tiempo, la recepción crítica de su concepto estático de percepción urbana; los medios de transmisión de sus ideas en el siglo XX y su habitualmente inconsciente y prolongada influencia en algunas investigaciones de los años de postguerra.

Palabras clave
Hermann Maertens, Escala Óptica, Percepción Visual, Planeamiento Visual, Ciencia y Arquitectura, Perspectiva

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... buildings about it should answer in some proportion to the open area in the middle, that it may not seem too large, by means of the lowness of the Buildings, nor too small, from their being too high

Leon Battista Alberti, The Ten Books of Architecture, half of XV Century

Introduction

In the second half of the XIX century, art history, aesthetic reflection and psychology of perception often crossed issues and methods, implicitly seeking for a mutual legitimacy and a developmental orientation. In the fundamental Der Stil (1860-63), Gottfried Semper had linked the three spatial moments of aesthetic perception to the human body: height, width and depth were synonymous with symmetry, proportion and direction. A few years later, Robert Vischer had exposed his idea of Einfühlung or Theory of Empathy in Über das optische Formgefühl: and Beitrag zur Ästhetik (1873), correlating the perceived form with the subject, his mood and his personal predisposition to grasp the meanings and sensations.

The work of the German architect Hermann Eduard Maertens (1823-1898), and in particular his research on the Optical Scale or Optische-Maassstab in 1870s and 1880s, lies in a common area with the various scientific and artistic disciplines that were evolving rapidly in those years. Thus, his work can be analyzed from both the point of view of visual physiology and cognitive psychology, as well as in an architectural and urban planning key. This enquiry focuses particularly on the scientific base of his studies and the reception of his studies on the correct visual distance in the field of urban studies and design, often by unaware scholars and designers of the XX century.

Visual perception at the end of the XIX century

The picture of scientific studies at the end of the XIX century is particularly lively thanks to the engagement of Hermann Helmholtz (1821-1894). His research on the physiology of the eye and vision was part of the activities of the Berlin Physical Society, whose members were concerned with the measurement and representation of space and time. They elaborated, used and refined tools such as “Telegraphy, imaging devices, electromagnetic devices for time measurement, and graphic display of temporal processes connected with light, sound, or neurophysiological phenomena” and, through the pages of the journal Die Fortschritte der Physik, they undertook to find application fields, for example, for their methods of measuring small time intervals through graphical devices capable of enhancing shifts or imperceptible transformations.

In his treatise entitled Handbuch der Physiologischen Optik (1856-1867), Helmholtz not only had pointed out that the human eye sees in detail only a small fraction of the visual field but he also established how this fraction could be measured. Thus, he determined the unit of measurement in the evaluation of the vision, establishing that the size of the figures represented should be subtracted to one-minute arc size at the conventional reading distance.

The work of the Dutch Franciscus Donders (1818-1889), the most accredited founder of the science and art of vision measurement, with significant relapse on ophthalmology, has been engaged properly on this fundamental observation. Already before his lucky On the Anomalies of Accommodation and Refraction of the Eye (1864) translated into French, German and Italian, Donders had coined the term “visual acuity” to measure and describe the sharpness of vision through the relationship between the result of subject and the average result of the popu-

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2 Hermann Eduard Maertens was born in Halberstadt on August 16th, 1823. He studied architecture at the Academy of Fine Arts in Berlin. He was employed in the construction offices of Prussian cities and he taught as an Assistant professor at the Königliche Landwirtschaftliche Akademie Poppelsdorf in Bonn. In 1874 he married Clara Anna Pauline Hermann (1846-1908) who gave him two sons, Paul and Max. Then he worked as Military Architect (Garnisonbaumeister) in Cologne. He also had a private practice in Bonn, where in 1890 he contributed in restoring Ludwig van Beethoven's birth-house and converting it into a museum. He died in Bonn in 1898.
4 Helmholtz defined it as Mikroskopie der Zeit, the microscope of time.
The Optical Scale of Hermann Maertens

In 1877 Hermann Maertens published the first edition of *Der Optische-Maassstab* or *Die Theorie und Praxis des ästhetischen Sehens in den bildenden Auf Grund der Lehre der physiologischen Optik*, that is “The Optical Scale or Theory of Aesthetic Seeing in the Visual Arts from the Perspective of the Physiology of Vision.”

Maertens, in his treatise, proposed a system of visual acuity measurement that was based on the work of Hermann Snellen, a Dutch ophthalmologist who developed the Snellen chart. Snellen’s chart, published in 1862, is a standardized test chart used to measure visual acuity, which is the ability to see details.

Maertens’ optical scale was an attempt to quantitatively determine the limits of visual perception, focusing on the resolution of the eye. He believed that visual perception was not just a matter of seeing the whole, but also of understanding the parts within the whole. His scale was designed to be used in the field of architecture to determine the limits of representation, essentially defining what could and could not be drawn.

Maertens’ scale was based on the idea that the human eye has a certain resolution capacity, and that this capacity could be measured and quantified. He proposed a system of visual acuity measurement that was based on Snellen’s optotypes, which are graphic symbols used to measure visual acuity.

Maertens’ scale was a significant contribution to the field of architectural representation, as it provided a scientific basis for determining what could be represented and what could not. This was particularly important in the era of the Industrial Revolution, when there was a need for precise and accurate representations of buildings.

Maertens’ scale was also a significant contribution to the field of art theory, as it provided a scientific basis for understanding the limits of visual perception. This was particularly important in the era of the French Realists, who sought to depict the world in a realistic and accurate manner.

Maertens’ scale was not without its critics, however. Some argued that it was too deterministic, and that it ignored the subjective nature of visual perception. Others argued that it was too complex, and that it was difficult to use in practice.

Despite these criticisms, Maertens’ scale was a significant contribution to the field of visual perception, and it continues to be studied and discussed by researchers today. It is a reminder of the importance of scientific thinking in the fields of art and architecture, and of the need to balance scientific precision with artistic intuition.


Even today the definition of the limits of the “representable”, which is generally adopted to determine what is to be drawn and what to be excluded at the different scales of architectural representation, is basically the result of the observations of those scholars. Quite appropriately, since the first edition of the Hermann Maertens’ treatise, the first illustration included in the text is a pair of Gothic characters over the 5x5 grid of Donders and Snellen: the letters “u” and “i” are there to indicate how all his monumental work is based on the ability of ocular resolution and visual acuity to distinguish, respectively, a single line and to two lines divided by a narrow blank space [Fig. 1].
The title, together with the epigraph, is an explicit homage to Helmholtz’s work as well as an attempt to share his discoveries about visual perception with artists. According to Maertens, the artists could no longer afford to ignore that an aesthetic judgment is determined by the first impression of a work and that this is the result of a generally fixed gaze, in which a fundamental role is played by the normal or direct vision, that is extremely limited if compared to the general human field of view.

By reading the front page of the first edition one can understand the vastness of Maertens’ ambitious project of a scientific reform of art, architectural and urban planning. His book was addressed to “Architekten, Maler, Bildhauer, Musterzeichner, Modelleure, Stukkateure, Möbelfabrikanten, Landschaftsgärtner und Kunstfreunde”. Within seven years, Maertens passed from the 146 pages (63 illustrations, 14 tables and 4 lithographed plates) of the first edition to the 434 pages (73 illustrations, 12 tabs and 1 plate) of the second edition (1884), in which he synthetized in “Ateliers und Kunstschulen der Architekten, Bildhauer etc.” the list of his target interlocutors to emphasize the didactic priority of his work [Fig. 2].

As a descendant of the Renaissance perspective critical tradition convinced of the pervasiveness of the visual effect on proportional mathematics, over twenty years Maertens took on the task of collecting – and often surveying on his own – detailed metric data of dozens of European monumental complexes with the pur-
pose of establishing the operation of visual perception in the urban environment with mathematical certainty. Basing on these documents, Maertens elaborated a kind of system of optical proportions that translated the secret formal relationships of architectural spaces into easy geometric ratios.

A triad of visual angles

Maertens’ approach to the problem of the visual relationship between the façade of a building and the space before it is expressed by a triad of visual angles that set distances and thresholds for three different ways of contemplating architecture. He fixed these angles in a series of profile illustrations: $18^\circ$ is the angle of field in which an artwork or a building appears to be part of the surrounding context around it in a whole image; when it is seen under a visual angle of $27^\circ$, it appears in its integrity and completeness; under a visual angle of $45^\circ$ or more, the observer’s attention is conquered by the details [Fig. 3].

To provide historical and operational validity to his conjectures, Maertens worked on two parallel tracks: on the one hand, he elaborated a number of perceptual analyzes of Italian, French and German squares and monumental historical complexes; on the other, he proposed a series of typical design situations to demonstrate how his Optical Scale would optimize the placement and dimensioning of artworks, signs, screens and pathways within a museum room, a street section, a garden or a palace [Fig. 4]. His analyzes naturally needed to demonstrate the validity of the approach and to make the system more appealing especially to designers who pursued the inscrutable canons of space harmony of so many historical sites.

While the numerical data after the analyzes resulted into complex oversized tables for the benefit of the most resolute historians, the meta-design devices are illustrated by a series of drawings in section and, rarely, in plan. For example, the com-
The combination of plan and section of a garden organized around a monument shows the Maaastab's efficiency in determining the size and position of the protection fence, the crown of flowerbeds and the path of passage according to visual concentric circles derived by the application of the visual angles of 45, 27 and 18 degrees of the people walking or sitting down around the monument itself [Fig. 5].

Maertens proposed investigations and integration of optical correction devices, which were also an heritage of an historical architectural practice at risk of extinction. A separate discourse would deserve the architectural detail. He analyzed it through the same readability parameters that indicate the correct size of the letters on a road sign to be seen in the distance. He had established that, apart from some correction coefficients due to brightness and chromatic contrast effects, the body of the typographical character should be the 3.450th part of the maximum reading distance. He then devoted himself to the elements of classical moldings and their almost imperceptible formal variations in the highest parts of a temple or a church. In the size of the triglyphs or thin dentils, Maertens felt he had found the equivalent of Donders' optotypes, the limit case in which the visual acuity of the observer was to be tested.

Although Maertens measured the visual cone with angular values, it is important pointing out that his angular triad refers to the fundamental ratios of 1: 3, 1: 2 and 1: 1, the divisions resulting maliciously approximated at 18, 27 and 45. 45 is actually the sum of 18 and 27 and the three numbers are in the ratio of 2: 3: 5 among themselves, having 9 as a common denominator [Fig. 6]. This arithmetical relationship suggests that Maertens, aspiring to discover and disseminate a law with a universal value, felt it was necessary to design it with some elementary geometric relationship, in order to dress it with some absolute or divine attribute or just to make it easy to remember and apply.

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8 Maertens, Der Optische-Maassstab, 1884, 4.
9 There is also a fourth ratio, equal to 1:6, approximated to 72°, which would mark the threshold of the panoramic view but it was quite secondary to Maertens' main interests.
In selecting these numbers, a marginal role might have played the singular work of the Bavarian economist Wilhelm Butte. In his *Prolégomènes de l’arithmétique de la vie humaine* (1812), immersed in Kantian apriorism as well as esoteric numerology, Butte had divided man’s existence into nine-year climatic cycles, respect to the seven of the female life. Certainly, Maertens’ work is fueled by an organic conception of knowledge that nears him to the great men of the XVI and XVII centuries and that he shared with a few other scholars engaged in analogous scientific revision of the architectural principles. For example, in the same years the little-known Albert Eichhorn carried out a parallel research on the *akustische Maasstab* for theatrical architectures which is based on an original reinterpretation of Vitruvio’s text by taking Euclide’s division of the monochord rope as a unit of measure.

Of course, Maertens adopted other small licenses. For example, he almost ignored the width of the buildings – their extension on a horizontal plane – to focus on their height, the most important feature to influence human behavior. He also ignored the lower portion of the visual field below the horizon as if it does not affect the distance to look at a building from. Moreover, he assumed that human gaze is kept steadily along a horizontal axis while it instinctively moves to look for the optical focus and the visual balance point of the building, tilting – also due to the differences in the ground – and altering the behavioral pattern assumption.

**Human space and the Optical Scale**

Maertens’ work was a reference to the many designers interested in the aesthetic and narrative possibilities of *Raumkunst*: from Adolf Loos, who would be willing to size each single room according to the effect to exert on man [Fig. 7], to Le Corbusier, who elaborated the idea of architectural promenade as a sequence of visual effects. It could appear as a happy combination of Vischer’s idealistic aesthetics and Fechner’s empiricism and it gradually contributed to the elaboration of *Gestaltungstheorie*, bringing a substantial theoretical and operational contribution to an aesthetics of vision based on the physiology of the eye. Maertens’s ta-
bles were recommended to the architects who design a well-proportioned living room, as can be read in the voluminous *Wohnhäuser* by Karl Weissbach and still in 1927, fifty years after the first edition of the *Massstab*, Gustav Adolf Platz underlined his historical contribution in *Die Baukunst der neuesten Zeit*.

A summary of his ideas survived and was disseminated widespread, though largely anonymous and unconscious, thanks to Ernst Neufert. He redesigned and re-assembled Maertens’ most important diagrams to ground the main core of the pages dedicated to visual perception in his *Bau-entwurfslehre*. Certainly, the publication of the manual since 1936 and its continuous updates contributed to providing these illustrations with the sense of a scientific tool useful to permeate the entire architectural design process of a determinism which was increasingly demanded by the industrialization of the constructive process [Fig. 8].

In particular, the dotted line cones Maertens had drawn in plans and sections to envision the look of pedestrians or tourists marked the imagination of architects and urban planners who aimed at turning the visualizations of their insights into scientific demonstrations. The visual cones, hitherto limited almost exclusively to the design of fortified and theatrical architecture, were adopted throughout the XX century as a visual tool to illustrate a number of different situations. The historian August Choisy adopted them in the analysis of the Athenian Acropolis while the architect Eugène Hénard used them to evaluate the Parisian vehicular traffic. Alexander Klein adopted them in his diagrams to demonstrate the inefficiency of traditional buildings while Le Corbusier used them to suggest a panoramic relationship between architecture and landscape, like in the projects for Algiers. Luigi Moretti used the cones to visualize the optical control of spatial sequences in the rhetorical apparatus of Fascist architecture while Gio Ponti did it to “narrate” the perceptual richness of residential spaces, like in Villa Planchart at Caracas.

At the time of Ponti, Maertens ideas had already been relaunched in America by Hans Blumenfeld at a conference in Yale and then in an article, which had the importance of providing a common scientific basis not only to Rudolf Arnheim’s study on visual perception but also to Christopher Alexander’s subsequent...
methodological researches set in 1977 in A Pattern Language: Towns, Buildings, Construction, and to Proxemics’ research Edward T. Hall presented in 1966 in The Hidden Dimension. Kevin Lynch’s investigations in urban and territorial settings were marked by Maertens’ observations, as well. For example, Lynch suggested a ratio between 1:2 and 1:4 between height of enclosing walls and a space dimension is most “comfortable” with the sense of “enclosure”, which is lost when the ratio is beyond 1:4 and if less than 1:1, the space being like a “pitch or trench”.

The Visual Planning

The main field of application of the Optische-Maasstab was certainly the urban planning, especially those experiences that critically recovered the picturesque tradition, giving rise to the concept of Townscape and Visual Planning. Eventually, Maertens had the ambition to find a scientific justification for the compositional principles practiced for centuries even if according to several different aims. Although the perspective figurative revolution had taken place in Florence at the beginning of the XIV century, there are only few written notes about the perceptual opportunities offered by the squares, like Leon Battista Alberti’s in the epigraph of this article. Only in the second half of XVI century, when Michelangelo’s innovative square at the Campidoglio was still under construction, Andrea Palladio defined the squares like those “wide places left in the cities” in order to see “the appearance of some beautiful fabrica” and mostly of some Temple. The XVII century records a new awareness about the relationship between the right distance and the visual effect of architecture. Jules Hardouin-Mansart questioned on the value of the incidence of the visual angle on the perception of his urban projects. Writing about the new axis of the Chapel of the Sorbonne, in a letter to Cardinal Richelieu, it is noted that “without the opening of this avenue and the square, the church would not emerge the half of what emerges now”. Gian Lorenzo Bernini is possibly an international exporter of this new sensitivity. In order to “see perfectly” the facade of his Louvre, he designed a square that was equal to one and a half the height of the palace, a ratio corresponding to Maertens’ visual angle of 27°. Elsewhere Pope Alexander VII, his fellow friend, asked for a wide square in front of the church of Santa Maria in Portico in Rome, to be “surrounded by decorated palaces”.

Charles De Brosses, in his Roman residence in the winter between 1739 and 1740, claimed the Italians have the visual art of transforming nature into art and art in nature: “What is wonderful in Rome is the way to arrange the points of view and to set up the display of the individual objects. This art is the principle that contributes in lesser form to giving the city this air of greatness. It cannot be felt at all in Paris.”
The Parisian situation was to change dramatically in just a century and the experience of the tree-lined boulevards opened by the Baron Haussmann fascinated a whole generation of architects. In their eyes, Paris became a “transparent” city: drawing one’s own itinerary seemed as easy as to move into a “well-designed home [Heimat]”.

Visual Planning and Optical Scale

At the end of XIX century, an unprecedented attention to the urban perception of a mobile subject stimulated the spread of scientific planning criteria related to human physiological characteristics. As already pointed out by Brian Ladd and, most recently, by Ákos Moravánszky, Camillo Sitte was the main protagonist to bring city planners back to the point of view of a man walking. As a scholar of Piero della Francesca and Italian perspective, he considered streets and squares as active components in the construction of the image of the city. He analyzed the contribution to the visual effect on the observer and re-evaluated the continuity offered by staircases, galleries and arcades in a perceptual and spatial sense, whose design and scale psychologically refer to the experience of internal spaces. Still, he did not explicitly mention Maertens’ work, perhaps because he considered obvious the ratios he had identified or simply because he did not aim at transforming urbanism into a science. Although both “share the desire to establish a method by which to judge the aesthetic outcome of urban planning”, Sitte did not provide scientific keys to a valid insight into urban kinetic perception. In the end, the success of his book Der Städtebau nach seinen Künstlerischen Grundsätzen (1889) is also due to the popular approach, accessible language and synthetic iconography while instead Maertens’ meticulous treatise may result hermetic and tiring.

Anyway, the immediate success of Maertens’ ideas in the field of urban planning is evidenced by the booklet Optische-Maass für den Städte-bau (1890), a synthetic and cheap summary of his researches expressly targeted to city historians and urbanists. It possibly influenced Raymond Unwin, who found a methodological inspiration for elaborating the principles of “informal planning” and to give back to vision a central role in urban organization as a sequence of paintings-like visual experiences. Most of all, the town planning manuals of Gurlitt, Stübben, and Brinckmann immediately embraced the scientific method and results of Maertens’ studies. They marked profoundly architects like Theodor Fisher and his follower Heinz Wetzel from the Stuttgart school who was deeply inspired by his new consciousness of vision. “Wetzel was convinced of the existence of certain universal rules that had to be applied to create spatial order. To him, topography was the key. The highs and lows were decisive. The layout of the streets had to be decided upon Schwelle (threshold) and Einschlag (impact). According to Wetzel, Längenvisierbruch (a change in the street’s gradient) should coincide with Horizontalvisierbruch (a shift in street direction or an offset in the building line) to produce a Raumbild (the picture produced by enclosed space) that convincingly seemed gewachsen (grown) instead of gemacht (made)”.

It is also interesting to note that Fischer’s courses at Stuttgart were attended by some of the most original and sensitive personalities of the XX century, such as Dominikus Böhm, Hugo Häring, Ernst May, Erich Mendelsohn, J.J.P. Oud, Bruno Taut and Sigurd Lewerentz.

With his Town Planning: Past, Present and Possible, in 1902 Inigo Triggs contributed to disseminate Maertens’ studies even to America. Still in 1922, Werner Hegemann and Elebret Peets adopted his criteria in their urban planning manual, ambitiously entitled The American Vitruvius. They not only found the dimensional limit of the square in the 1:3 ratio (corresponding to 18°) but above all explicitly referenced to the “modern investigations” by Maertens by applying the visual...
angles of 18, 27 and 45 degrees on the profiles of the main Roman and Parisian squares in the table titled *The Size of Renaissance Plazas* [Fig. 10].

**Critical reception and abuse**

Hermann Maertens’s outcomes were not acrimoniously assimilated. In the global reconsideration of the XX century city in terms of circulation and undecorated volumes, some scholars judged Maertens’ inquiries as antiquated and reactionary, anchored to the reassuring static nature of the Renaissance perspective.
For example, Idelfonso Cerda analyzed the modern city around the key notions of rest and movement, comforted by a wealth of references to biology, anatomy and medicine, in his *Teoría general de l’urbanización* (1867).

In his inaugural speech at the University of Leipzig in 1893, entitled *Das Wesen der Architektonischen Schöpfung*, or “the essence of architectural creation”, August Schmarsow began to develop the perceptive empiricism in a foundational principle, by assuming the bodily movement through space as the very essence of architecture and condemned the stationary perception of form, as proposed in the same years by Wölfflin and indirectly by Maertens himself.

Anyway, it took decades to evolve the Renaissance-born vision scientifically re-defined by Maertens in something totally new. Quite in the same years in which Neufert was customizing Maertens’ schemes for his manual, Herbert Bayer, another formerly student at the Bauhaus, was elaborating an innovative exhibition structure for a new dynamic and immersive perception, immortalized in 1935 in the famous *Diagram of the Extended Field of Vision* [Fig. 11].

Maertens was criticized not only for the implicit stillness of his visual analyses but also for the presupposed frontal vision of the work which prevails in his schemes. Stübben found that his formulas were likely to produce squares that look too dilated37. Brinckmann, who was author of analysis and schemes based on Maertens’ work, tried to temper his stainless determination through a series of psychological considerations. He emphasized the role of optical illusions and that of the elements referable to the human scale in the optical measurement of building bodies. For example, he recalled the different effect of buildings more or less cut out, articulated or stylistically heterogeneous: a Gothic cathedral is articulated in a myriad of parts and may looks larger than a building of the same size in Doric or industrial style38.

The visual approach of Maertens deeply binds the shape and position of the architectural body to its immediate spatial surroundings, making them indissolubly bound. If it is necessary to preserve a specific free distance for the best enjoyment of the monument and volume of the church, then the surrounding visibility area becomes implicitly a part of the building itself, a sort of visual servitude. Quite the same could be claimed for the path route considered propaedeutic to the visual discovery and exploration of the building.

While this observation contributed to a mature concept of the city as an interconnected system of spaces and volumes, on the other hand it could legitimate also the idea of the city as a collection of monuments. Describing the Cologne Cathedral, for example, Maertens asserted “it is therefore justified the use of leaving out, articulated or stylistically heterogeneous: a Gothic cathedral is articulated in a myriad of parts and may looks larger than a building of the same size in Doric or industrial style38.

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Conclusions

Though today scarcely known, Hermann Maertens’s work initially received a remarkable credit from his colleagues and not only. Basing on the physiological observations of Helmholtz and Donders, Maertens investigated scientifically the question of the optical scale in the perception of human environment, from the scale of the artwork in a room to that of a building in a large square. The arithmetic determinism of his approach and the amount of data and observations in his books provided some modern architects with tools to partially fight the unconscious components of the design process according to the industrial-inspired idea of a Neue Sachlichkeit. At the same time, they re-centered the mission of the designer around human body and sensorial features, even if according a Renaissance-perspective static vision, with an attention to proportion that will be recovered by few modern architects, like Le Corbusier.

The dissemination of Maertens’ results was limited by the complexity of his treatises as well the lacking of an organic translation of them. It gradually exhausted in the years between the two world wars and the results of his researches were transmitted partially or unconsciously, thanks to the reproduction of a few of his illuminated diagrams or some rough written synthesis. The Optical Scale did not strike deep into the architect’s practice, confined in small appendixes of the most diffused design manuals or graphic devices applied on a plan to remind the presence of a vantage point or to attribute at least a semblance of science to architectural processes and products. From this point of view, his story confirms the congenital difficulty, in some ways ever present, of transforming the design practice into a properly scientific process, as if the designer felt his creative autonomy threatened by principles, methods and tables. But even if an almost indirect way, Martens’ ideas fertilized a ground that is common to a number of interdisciplinary studies that deeply marked the development of urban and architectural culture from the 1960s. Even today, the idea that there is a proper way to look at a building, with a precise distance according to the finality and the definition of the detail, is something that could be very useful in the production and use of visual interfaces and images generated by the computer often with no awareness of the physiological behavior of the human eye.

References


