Aesthetic Investigations
Published on behalf of the Dutch Association of Aesthetics
Special Issue – Architecture beyond the building

Surplus of form: Architecture and the status of the object

Author Jörg H. Gleiter
Affiliation TU Berlin

Abstract: The surplus of matter in form designates the principles of architecture. It contains not only a constructive principle, but also an aesthetic principle that enables sensuous experience. In the coupling of construction and sensuous experience, we find the basic prerequisites for an aesthetics of architecture, but also the philosophical-aesthetic difficulties confronting architecture. For Kant, it was architecture's object character that stood in the way of an architectural aesthetics as part of a general aesthetics. For him, only the architectural drawing, because detached from matter, construction, and function, could meet the criteria of the beautiful, and that only as a façade view and not as a ground plan or sectional drawing. With reference to Aristotle, Kant and Schopenhauer and an outlook on contemporary architecture, the essay outlines the principles of an aesthetics of architecture as it is to be developed out of the specific material conditions of architecture and which has its starting point in the surplus of form.

I. INTRODUCTION

Surplus of form is the foundational principle of architecture.[1] There is no architecture that does not follow this principle. Suppose that the matter of architecture – whether this be wood, stone, clay, or even steel – would admit of no surplus of form, that it would always be embodied in only one form. In that case, everything would be predetermined, and no architect would be necessary.

Aristotle, in his *Metaphysics*, was the first to describe the surplus of form under his concept of the matter-form relation, the latter of which developed

into the concept of hylomorphism in the 19th century. But an indication of the importance of the surplus of form can already be found in a saying attributed to Anaxagoras and reported by Aristotle: that humans are the smartest of the animals, because they have hands.[2] And, we may add, because of this they are also the freest. For the surplus of form is a precondition for the ability to create a freely chosen environment that is fit for human needs. For as long as human beings are characterised by what Hannah Arendt calls 'the working life of the free craftsman', it would be questionable whether such a life is even possible, would not matter permit a surplus of form; for then there would be nothing to create, nothing to work upon.[3]

According to Arendt, the human world consists 'of things produced by human activities'.[4] Human beings give matter form and shape, in other words they create things and build buildings. These things are not only used, they are also perceived sensibly. The surplus of form is therefore not only a practical and constructive principle, guiding the creative process, but it is also an aesthetic principle, in the tradition of Alexander Gottlieb Baumgarten, that connects diverse sense perceptions and the knowledge contained within the act of sensing. For architecture, this means that the principle of form brings together functionality, good construction and aesthetic appeal.[5]

Surplus of form is not only the precondition of an aesthetics of architecture, but also the difficulties that architecture has confronted within philosophical aesthetics, especially those aesthetic philosophies that have reduced architecture to the art of building, thereby excluding the ordinary experiences of architectural works. One can see this in Immanuel Kant's *Critique of the Power of Judgment*, his proposal for an aesthetics covering all forms of aesthetic experience. Because of architecture's materiality and/or its goals, Kant spoke disparagingly of the art form in the 'Analytic of the Beautiful' at the beginning of the third Critique. For Kant, only architectural drawings accommodate the criteria of the beautiful, and then only when such a drawing is an elevation and not a floor plan or section drawing; as only the former is sufficiently cleansed of qualities like matter, construction, and function, that determine the 'physical existence of the object'.[6]

Kant's huge influence on philosophy led to architecture's precarious status within philosophical aesthetics throughout the 19th century. The first attempts to do justice to architecture as an aesthetic discipline, precisely because of its object character and its use in everyday life, came only after the introduction of new materials (like steel, concrete, and glass), as well as new architectural technologies. Such efforts, which drew upon the metaphysical doctrine of hylomorphism developed in Aristotle's writings on metaphysics, were also in critical dialogue with Kant. In this way, writers from the middle of the 19th century onwards settled on the principle of the surplus of form as the means by which to formulate an independent aesthetics of architecture, based first on the model of poetry in the aesthetics of tectonics (Karl Bötticher, Gottfried Semper), and later oriented psychologically on the model of

the aesthetics of empathy (Heinrich Wölfflin, Theodor Lipps, Wilhelm Worringer). Moreover, Aristotle's philosophy also provided a way to free architecture from the strict confines of the art of building to a broader conception of it as a practice of everyday life. As a result, a fully differentiated aesthetics of architecture was developed in the 20th century on phenomenological, semiotic, psychological, and anthropological foundations.

The preceding paragraphs have sketched the outlines of an aesthetics of architecture that, according to the thesis of this essay, takes the surplus of form as its point of departure. But this essay primarily concerns itself with the preconditions of such an aesthetics, in other words: the elucidation of the status of architecture as an object and the surplus of form underlying architecture. Because the theme is big, but space is limited, a detailed explication of an aesthetics of architecture, especially regarding the increasingly differentiated theories and practices of architecture in the 20th and 21st centuries, will have to be deferred to future research.

II. OBJECT

As briefly noted, philosophical aesthetics has historically struggled to accommodate architecture. This is primarily due to the fact that Kant's 'Analytic of the Beautiful' (hereafter: the 'Analytic) in the *Critique of the Power of Judgment* largely excluded architecture from aesthetics. The great influence that Kant exerted on philosophers' ideas regarding architecture, delayed the development of the aesthetics of architecture until long after the 19th century.

For Kant, the architectural object's status as an object, that is, its material presence, its functionality and purposiveness, and thereby its orientation towards the agreeable and the good; proved to be an insurmountable obstacle to an aesthetics of architecture. Architecture could not lend itself to the four definitions of the judgement of taste, derived by Kant in the 'Analytic': first, that beauty is predicated on an object that pleases 'without any interest';[7] moreover, that the beautiful pleases without relying on concepts;[8] third, that beauty is the form of purposiveness 'without representation of an end';[9] and, finally, that the beautiful is 'cognized without a concept as the object of a *necessary* satisfaction'.[10] Because of its object character, architecture could not satisfy any of these criteria.

In the opening paragraphs of the 'Analytic', Kant elucidates the 'First Moment of the judgement of taste':[11] the moment in which aesthetic judgement's disinterested delight in its object becomes apparent.[12] Here, Kant immediately proffers architecture as his negative example. According to him, 'a regular, purposive structure' can be apprehended with one's cognitive faculties, in which case the resultant judgement is logical and not attended by disinterested delight, as would be the case for the image underlying an aesthetic judgement.[13] An aesthetic judgement made about architecture would always include knowledge of its purpose, as well as the logic of the concrete

object, whereas the judgement of taste is precisely 'not a cognitive judgement, hence not a logical one, but is rather aesthetic'.[14] After all, what prompts aesthetic judgments is not the object itself, but the feeling awakened by the subject's imagination. Things are beautiful only to the extent that 'we judge it in mere contemplation (intuition or reflection)',[15] and only to the extent that 'the mere representation of the object is accompanied with satisfaction in [us]'.[16]

In this way, the beautiful is also differentiated from the agreeable and the good, in other words from everything that is dependent on an interest in the concrete object, as is the case for architecture. Similar to logical judgments, judgments of goodness or usefulness require a concept, which in turn implies, according to Kant, 'the relation of reason to (at least possible) willing, and consequently a satisfaction in the *existence* of an object or of an action, i.e. some sort of interest'.[17] By contrast, the beautiful is unrelated to the existence of an object; the judgement of taste turns on 'what I make of this representation in myself, not how I depend on the existence of the object'.[18] Consequently, Kant's conception of pure beauty leads us away from architecture, because of the latter's object character.

For Kant, therefore, architecture can only be the object of a judgement of taste, whose form is abstracted from its materiality. In other words, it is only as design, as lines on paper, does the perceiver's imagination suggest the representation of a building. In so far as painting, sculpture, and especially the formative arts such as architecture and horticulture are fine arts, the *design* is what is essential. The pleasure derived from form, rather than what gratifies in sensation, is taste's fundamental prerequisite.[19] In other words, architecture is only beautiful as a composition of lines in a drawing. Kant thereby confined architecture to a formal aesthetics:

> The *charm* of colors or of the agreeable tones of instruments can be added, but *drawing* in the former and composition in the latter constitute the proper object of the pure judgement of taste.[20]

Charming things like colours are only supplementary; at most they can enliven a representation and intensify an experience through their charm.[21] They keep the attention focused on the object. But this is all they do, and they leave the representation of the object untouched; the latter is only affected by form.

III. LINE

With his focus on drawing, Kant continued a line of development in architecture that brought him far beyond the conception of design that is important for architecture itself. To see this, one only needs to go back to the 15th century, when design first became a focal point of architecture and architectonic drafting. Only on the basis of design, could architecture establish

itself as an artistic and intellectual practice. Before, it was mostly an *in situ* practice during the construction process. Key to this development was Leon Battista Alberti, whose treatise *On the Art of Building in Ten Books* (*De re aedificatoria*) obliged architects to represent their ideas, in contrast to that era's practices, in detailed and proportional drawings.[22] From then on, the drawing board, rather than the construction site, was the workplace of the architect: 'the whole matter of building is composed of lineaments and structure', as Alberti wrote.[23] This means, first, that architects make their finished thoughts explicit in scale models or working drawings on paper. But it also means that the architect uses the medium of drawing to develop ideas, first as sketches, then later as precise plans, elevation and section drawings, allowing the builder to create the designed building by following precise instructions.

Marcus Vitruvius Pollio had already discussed the technique of drawing in *Ten Books on Architecture* (*De architectura*), the only treatise from the ancient world to have survived. Vitruvius also divided design into three design species, known as *ideai* in Greek, which are: ichnography (plan), orthography (elevation), and scenography'.[24] One must assume, however, that in ancient times, such drawings were schematic; made to serve more as an overview during the building process rather than a precise representation of details. It was nevertheless this tripartite distinction to which Daniele Barbaro alluded in his commentary to the Italian translation of Vitruvius' *Ten Books on Architecture*. There, he emphasised that design is the medium of reflection and conception of architecture, since the architect first conceives of architecture in the mind, and then makes it manifest in three types of drawings.[25] But Barbaro wrote this when, in the second half of the 15th century, due to Alberti's influence, the conception and function of design had changed dramatically. Drawings were no longer schematic or abstract, but had a logical relation to the construction of the building and therewith its matter. Barbaro accorded exceptional importance to the cross section, in this respect, since it exemplifies the proportions of the finished building, including the thickness of its walls and beams, especially well.[26]

For Barbaro, when it came to design, the decisive reference point was Alberti, not Vitruvius. By introducing the scale drawing, Alberti turned building into architecture, the art of building. The architect works while being surrounded by books, images, sketches, and drawings. Scale drawings could now, for the first time, enable architects to reference the buildings of other architects, from other times and places, such as for instance the Greek temples of Magna Grecia in Agrigento or Selinunte. The architect no longer needed to actually see them. The scale drawings of ancient ruins could serve as the matter for an inventive, intelligent, and beautiful play with the forms of architecture. These old buildings could now be cited, copied, varied at will, and combined to create new figures with new effects.

Alberti also emphasised that the so-called 'lineaments', the lines made up by the architect, allowed the architect to work with the forms and contents

of architecture, isolated from its matter and materials. The lineaments do not 'have anything to do with the material [...] It is quite possible to project whole forms in the mind without any recourse to the material [...]'.[27] With pen and paper, architecture can be artistically and freely conceived, with lines and shapes acting as the carrier of meaning. More than ever before, the process of designing became formative for the entire history of architecture. Moreover, the architect no longer had to repurpose spolia, the fragments and remains of antique buildings, in order to relate a building to architectural tradition. Finally, this also transformed the social stature of architecture. Because the lineaments were 'conceived in the mind' and were thus 'perfected in the learned intellect and imagination', architecture became an intellectual and artistic practice, and the architect a *uomo universalis*, the humanistic ideal of a person.[28]

Alberti's innovation is what Kant was relating to, when he argued that design and composition are what is essential to the art of building.[29] But when Kant discusses design, unlike Vitruvius and Barbaro, he does not have in mind the triad of ichnography, orthography, and scenography. Kant merely thinks of orthography, or: the representation of a façade, the one form of drawing that seems least influenced by the material, constructive, and functional demands of architecture. This is where Kant misunderstands architecture. From the point of view of design, a building can be adequately represented only by combining ichnography, orthography, and scenography. The elevation drawing alone cannot be sufficient for three-dimensional objects such as those of architecture. Kant is therefore not strictly speaking of architecture when he discusses architectural designs. He excludes the objects of architecture, their presence and their materiality.

Moreover, an architectural design is only seemingly freed from its matter. Alberti knew this, and Barbaro hinted at it. It retains a special connection, viz. an indexical relation to the matter in which the building should be built. An architectural design carries a material and constructive index with it, especially though not exclusively, for the architect. This means that architectural drawing is not abstract, but rather always points to the building that it represents and which is to be built. Two parallel lines on a floor plan are not just a placeholder for a wall. They are not mere arbitrary signs, they rather carry with them the idea of a certain materiality and form of construction. They are traces on paper of a formal, *as well as* material appearance of the wall. According to Alberti, the parallel lines – notwithstanding the freedom that the drafting of an immaterial design affords – are charged with matter and are therefore concrete. For Kant, on the other hand, a line is merely the shortest distance between two points, and is therefore abstract.

By reducing architecture to the representation of a building in elevation, Kant also reduced the architectural drawing to mere imagery abstracted from its indexical nature. In this way, architectural drawing can satisfy the criteria derived in the 'Analytic'. Kant was unaware, however, of the ambivalent

nature of the lineaments of an architectural design. On the one hand, architectural design first allowed architecture to become a medium of learned reflection and speculation about its own artistic, historical, and social status. But at the same time, architectural design also always points to matter. While Alberti elevated architecture, through design, to art and entered it into the discourse of aesthetics, Kant, through the same means, demoted it.

IV. AESTHETIC IDEA

Even though the material object of architecture could not lend itself to a pure judgement of taste, architecture is nevertheless thoroughly discussed in Kant's system of the fine arts, in the paragraph 'The division of the fine arts'.[30] According to Kant, the fine arts are located on a spectrum between two poles: on one hand, we find the ability to incite a free play of the imagination that enlivens the mind and harmonises with the *understanding*, which relates to an artwork's formal aspects. And on the other hand, there is the ability to trigger pleasant sensations, which appeals to the subject's *feeling* and the sensible functioning of artworks. As a rule, the arts are somewhere between having either of these abilities; some are more inciting the power of imagination, while others are better at inciting sensations. What specific arts do better is what determines their position in Kant's system of fine arts.

For Kant, the play of the imagination, and consequently the formal aspects of art, undoubtedly play the decisive role in fine art. The 'aesthetic ideas' expressed by art can only be communicated through form.[31] Nevertheless, it is distinctive about the fine arts, in distinction to beautiful nature, that they appear as material objects:

> ... with beauty in art this [aesthetic] idea must be occasioned through a concept of the object, whereas with beauty of nature the bare reflection upon a given intuition, apart from any concept of what the object is intended to be, is sufficient for awakening and communicating the idea of which that object is regarded as the *expression*.[32]

Notwithstanding this acknowledgement of the material presence of fine artworks, Kant is quick to delimit its role. With care, he uses the term 'occasioned', which implies: the material object provides the occasion, but is not the ground of the aesthetic idea.

Artistic works are artefactual and material: they have the character of being objects, even if this object character is wafer thin. On the basis of this, Kant erects a hierarchy of the arts where, even though architecture is the most material of all the arts, it does not occupy the lowest rung. Since art is about the expression of aesthetic ideas, Kant orders the different disciplines with the help of an analogy to three ways in which speech can be expressed: through word (articulation), gesture (gesticulation), and tone (modulation). Within this order, architecture occupies the middle position of gesture.[33]

Since architecture, unlike poetry and rhetoric, is bound to materiality, construction, and function, it is less capable of inciting a free play of the imagination and understanding. On the other hand, architecture does more than simply modulate tones the way that music does, and thus it does more than merely incite a play of sensations. Kant therefore ranks architecture, along with sculpture and, surprisingly perhaps, painting and horticulture, in a middle position. According to Kant, architecture can communicate ideas even though it is typically constrained to, but not fully determined by, specific purposes and by specific movements. A door, for instance, is bound to specific rules, but can still be built according to a manifold of ways, with the use of various materials, and in various shapes. This enables the door to incite a free play of the imagination, while, on the basis of its spatial and material substance, it also incites a play of sensations, unless we are dealing with a door in a modern, new construction that because of its minimalist appearance suppresses both the play of the imagination and the sensations.

With the category of gesticulation, Kant accorded architecture a dynamic of its own. Architecture gesticulates because it invites its user to do something with it. When we approach a door, the door invites us to use the handle, open the door and step through it. Or, in the case of ornaments, we are enabled to relate a building to other epochs or other architects because of the likeness or analogies that the ornaments make visible. Within psychology and architecture, this is called an 'affordance'.

Kant recognised that aesthetic experiences come in mixed forms, that fine art can be more or less beautiful, that it can incite either the free play of the imagination or the free play of sensations to more or lesser extents. But Kant insists that '[b]eauty (whether it be in nature or in art) may in general be termed the *expression* of aesthetic ideas', and that it is necessary for fine art that 'this idea must be occasioned through a concept of the object'.[34] In turn, this object must be built according to a form that can communicate the idea, especially so in architecture. Tones, colours, and other things that can be experienced sensibly like the patterns of a tapestry may intensify the aesthetic idea, but they do not substantially contribute to it. The beautiful play of sensations – like colours, tones, or ornaments – can only promote the aesthetic idea. Only the intentional form, the immaterial line, either on paper or the line that defines an object's form (such as a cube) can be the bearer of aesthetic ideas.

V. HYLOMORPHIC TRANSFORMATION

The question where architecture truly belongs in aesthetics requires us to go deeper, conceptually and historically, beyond Kant and Alberti's reflections on architecture. For the indexical relation of line and matter originates in the form-matter relation introduced by Aristotle in his *Metaphysics* (where he also explicitly considers architecture), as material or formal cause, or matter-

form relation. Here Aristotle described the phenomenon that matter can only appear in concrete form: without form, matter has no real existence, 'it is only that which, not being a "this" actually is potentially a "this"'.[35] All really existing matter is therefore bound to form (as well as *vice* versa). The term 'hylomorphism' is thus derived from the Greek terms for the concepts *hylè* (matter) and *morphè* (form).

For Aristotle, the form-matter relation is the 'substratum' through which things can come into existence at all.[36] Only through form can matter appear and be perceived and, beyond that, become effective. In the process of formation, in other words: the orientation on that which should come into existence at the end, matter shows itself. The 'substance is the indwelling form, of which and of the matter the so called concrete substance is composed'.[37] For this reason, architects are needed to drive the formation process, which, not only engenders a form and a building, but also renders the substance of matter visible, thus making it knowable.

What this means can be shown in contradistinction to Plato. In Plato's metaphysics, the Forms exist as a reality separate from the world of material things. These Forms can only exist ideally and immaterially, since, once they're given sensible shape, they become corrupted by matter. Once apparent in an object, Plato's Forms are infected by matter as it were and no longer pure. Arnold Gehlen called this the 'resistance of things'.[38] For Gehlen, things are resistant to ideas that come from outside, which would otherwise appropriate these things all too easily. Matter can never by merely a medium for the representation of ideas, it participates in this representation, and forces its own laws upon it.

Aristotle offers a contrary insight, viz. that only in form the independent will and character of matter becomes sensibly perceptible. This allows us to construe the formation process as a cognitive one: knowing-how is what mediates between a pure, unqualified being-there (matter) and a qualified being-something (form). The process of making, the production process, is what first makes the substance-nature of matter appear, 'its coming to be implies change in that from which it comes'.[39] Only because the architect gives matter a form do matter's qualities show themselves.

Hylomorphism is important for architectural aesthetics, because the form that inheres in matter is not only relevant for the formation of raw materials like cutting stone into rectangular bricks or forging iron into beams, but also for the downstream process of using bricks or beams to create a wall or skeletal structure. Aristotle's matter-form relation also covers the system and principle of architectural construction. Even more importantly, as I argue here, it is the foundation for both the aesthetic appearance and functioning of architecture.

Significantly. Aristotle's discussion of the matter-form relation always returned to the example of a home. With his proposition that 'substance is a principle and a cause', Aristotle came very close to thinking about construc-

tion in architecture.[40] This is also visible in Aristotle's remark that 'stones, bricks, and timbers' are the potential for a house, and therewith they form the principle 'for these are the matter'.[41] On the other hand, whoever defines a house as 'a covering for bodies and chattels', is talking about what a house is in actuality, and therewith its cause.[42] But only those who combine both, 'speak of the third kind of substance, which is composed of matter and form'.[43]

For architecture, the matter-form relation contains the principles of generation (*Gemachtwerden*), or morphogenesis. For instance, the brick already contains the constructive principle of the entire house, because within it there is already the principle and cause for walls, rooms, house, and city. The rectangular shape of a brick, in which the matter (clay) and the form (cuboid) are combined into a third, the brick, already contains the potential for constructing a wall. A wall has the potential for a room, which in turn can be combined with other rooms into a house, which, when combined with other houses, can form a city. We can therefore find in bricks the potential for further morphogenetic or hylomorphic transformations.

In general, we can see that every composite thing itself also has the potential for a transformation of status. Thus, this composite thing holds the potential for another composite thing in another, higher step of the hylomorphic process, such that we can speak of an ever-repeating process of hylomorphic transformations.

To illustrate this abstract sketch of the process, for clay it would look as follows. In the first hylomorphic transformation, clay is matter that becomes an individual, determinate something, a brick, through a connection with the cuboid form. Inherent to the brick is, in turn, a new capacity, the potential to become part of a wall. The second hylomorphic transformation into a wall is generated by combining the material brick with the form of brickwork. In turn, the wall has its own potential which turns the end result of the second transformation (the wall) into the matter which can be combined with other walls in a rectangular form, a room, the end result of the third hylomorphic transformation. Then, when several rooms (matter) are combined in a particular way (form), a house can finally result from a fourth hylomorphic transformation.

Architecture, as we can see from the example of a brick contributing to the morphogenesis of a house, consists of such a series of hylomorphic transformations. This is important, because each and every element shows its value only in the next hylomorphic transformation, and this happens in two ways. A lone brick is worthless from an architectural point of view. Only when combined with other bricks into a wall, does a brick develop its potential, constructively as a wall, and aesthetically as that which separates two sides from one another. A similar thing holds for all further hylomorphic transformations; a wall for instance, is valuable constructively (as an essential part of the room), as well as aesthetically (as a separation between inside and

outside). Rooms, in turn, can be stacked on top of one another as part of a house (constructive), allowing for an experience of depth (aesthetic). The composition of many houses, finally, allows for an aesthetic experience of distance and nearness.

Thus, this process of hylomorphic transformation is by no means merely constructive. It is nothing less than an aesthetic process of transformation, where every element, on a higher level and beyond its constructive function becomes the object of a broadened sensibility and therewith aesthetic experience, thus connecting the aesthetic effect of architecture to architectural construction. Put differently, the hylomorphic transformation process finds its conclusion in the aesthetic experience within the perceiving subject, the viewer or the user. The surplus of form is the basis of this process.

VI. SURPLUS OF FORM

Over the course of the 19th century, with reference to Aristotle and in critical conversation with Kant, hylomorphism became the central theme of the aesthetics of architecture, exemplified by Arthur Schopenhauer's notion of the 'surplus' of form. Thus, he says in *The World as Will and Representation*: '[n]ecessity is the mother of the useful arts: abundance is the mother of the fine arts'.[44] The surplus of form in art corresponds to the surplus of Ideas in the artistic genius, in which Schopenhauer defines the Ideas as 'essentially intuitive and thus, when determined more closely, inexhaustible'.[45] This is why the Ideas can only be made clearly perceptible in art, that is what distinguishes them from mere concepts. According to Schopenhauer, whatever can be clearly represented by concepts need not be translated into art, as this would rather obfuscate the concepts.

In making the matter-form relation the basis of his aesthetics, Schopenhauer took matter as his point of departure:

> ... we discovered matter to be the common substrate of all particular appearances of the Ideas, and consequently to be the link between the Idea and the appearance of the individual thing. [However,] matter by itself cannot present any Ideas. This is also confirmed *a posteriori* by the fact that there can be absolutely no intuitive representation of matter as such but only an abstract concept: intuitive representations present only the forms and qualities supported by matter, and in all of which Ideas reveal themselves.[46]

And so, aesthetic experience is for Schopenhauer just as much a process of knowing the qualities of matter, as it is of knowing the Ideas presented through matter.

Architecture occupied a special place in Schopenhauer's aesthetics, as it did for Aristotle, because it is bound to matter more than the other arts. Schopenhauer argues that what he calls 'the will of matter' first becomes

tangible through the architect's work upon matter and the concrete form that results from this work. For Schopenhauer, one of the tasks of architecture as a fine art (abstracted from its function in ordinary life), is to render visible and knowable the qualities of its material, especially in the case of stone: '[...] gravity, cohesion, rigidity, hardness, these universal qualities of stone, those first, simplest, and dullest visibilities of the will, the sounds of the ground bass of nature'.[47] These qualities must be brought to intuition by architecture, as they are not visible in the mountains or stone quarries. In nature, stone shows only a few of its qualities: after all, what does a stone want? To roll to a lowest point and remain lying there. Anything more than this cannot be experienced from the stone in its natural occurrence.

Since stone provides a counterforce to heavy loads, 'the struggle between gravity and rigidity is in fact the only aesthetic content of fine architecture'.[48] This content is rendered visible through a surplus of form, the different varieties of columns and architraves. As Schopenhauer explains, columns provide an opposing force to the natural inclination of stone to roll to the lowest point. But this opposing force is equally a quality of stone itself. Columns exemplify the struggle of gravity and rigidity ...

> ... by depriving these indestructible forces of their shortest path to fulfilment, and detaining them along a detour that prolongs the struggle and makes the inexhaustible striving of forces visible in a variety of different ways.[49]

The art of building strives to render the 'objecthood of the will', especially that of the stone, visible.[50] This is especially clear in classical and classicist styles of architecture, which Schopenhauer favoured over gothic architecture, since the former thematises the division of supports and beams. By contrast, in the pointed arches typical of gothic architecture, material forces that are opposed to one another gradually blend into one another, leaving no clear distinction between supports and loads. To the detriment of architecture's epistemological function, the arches and vaults of gothic architecture obfuscate the principle that puts these forces in opposition. The same holds for brick walls: 'everything is both support and load, and hence there is not an aesthetic effect'.[51] Aesthetic effects, for Schopenhauer, must consist in the clear presentation of an Idea. As a result, Schopenhauer never theorised gothic architecture any further, since it did not fit in with his aesthetics.

Schopenhauer explicitly argued that the beauty of a building, as it is bound by the will of matter, cannot be disinterested or completely without concept. On the contrary, since architecture must make the objecthood of the will visible, the more clearly they fulfil the will of their stones, the more beautiful they are. This is what puts Schopenhauer's aesthetics in opposition to Kant:

> Since we have seen that the beauty of architecture comes primarily from the unconcealed presentation of the goal and its achievement by means of the shortest and most natural path, my theory ends up contradicting Kant's, which posits the essence of beauty in an apparent purposiveness without purpose.[52]

By basing his aesthetics in hylomorphism, and thereby theorising the development of art as starting from matter, Schopenhauer ended up disagreeing with Kant.[53]

From the foundation of art in hylomorphism, a hierarchy of the arts results. But, contrary to Kant's hierarchy, Schopenhauer's system relegates architecture to the lowest rung because the force of matter predominates within it. The more crucial matter becomes as a medium to present an Idea, the less freedom an artist has to present the Idea, and enact the will through a matter-form relation. Because the will of the stone consists essentially of hardness and resistance, architecture can express the Idea and will of the architect to a lesser extent. At the same time, Schopenhauer does not submit to the widespread opinion that architecture is simply determined by the coercive power of its functions and goals.

On the contrary, the 'aesthetic has nothing to do with human purposes', which it is the goal of a building to fulfil.[54] It only deals 'with the struggle of natural forces in the stone'. This is also characteristic of architecture; that it is not representational, like paintings and novels are: '[a]rchitecture is distinct from the visual arts and poetry in that it does not produce an *imitation* but rather the thing itself'.[55] The column is simply the column, not its representation, 'like music, architecture in general is not an imitative art'.[56]

Where it is highly determined by matter, architecture occupies the lowest rung in the hierarchy of arts. In distinction to the other arts, however, architecture does not merely form matter, it also distances itself from, or raises itself above it, through the progressive stages of the hylomorphic process. Through this process, architecture's bondage to the will of matter is lessened stepwise, while the freedom to give an objective expression to the Idea and will of the architect and the user is heightened in the same degree. A similar dynamic obtains for the aesthetic effectiveness of architecture, which is increased with every step in the series of hylomorphic transformations, while the constructive effectiveness is decreased in the same proportion. Constructive and aesthetic potential stand in an inversely proportional relation to one another. From clay to brick, to wall, to room…, the constructive potential is lessened, whereas the aesthetic potential is heightened through colour, ornaments, and surface patterns.

VII. ANNIHILATION OF MATTER

At the start of the industrial era, new construction materials like iron, concrete, and glass, triggered a crisis to which architectural theorists reacted laboriously. After the supplementary volume to Schopenhauer's *The World as Will and Representation* was published in 1848, Gottfried Semper published *The Four Elements of Architecture* in 1851, and Karl Bötticher published *Die Tektonik der Hellenen* in 1852.[57] Bötticher, especially, emphasised the concept of tectonics, already introduced by Karl Otfried Müller in 1830 in his *Ancient Art and Its Remains; Or A Manual of the Archaeology of Art*, translated in 1847 by John Leitch).[58] Like Schopenhauer, both Semper and Bötticher based their architectural aesthetics on Aristotle's matter-form relation, or the surplus of form.

Bötticher followed Aristotle in maintaining that unformed matter as such is unknowable and requires formation:

> When, however, one gives the requisite building materials a form, viz. the form of a construction part, when one orders all such constructions parts in an internally complete mechanism, the resting and latent life that inheres formlessly in the materials is awakened. It becomes a dynamic expression, necessitated by a static function, and it acquires thereby a higher existence, an ideal being, because now it functions as a member of an ideal organism.[59]

To clarify this distinction between dynamic expression and static function, Bötticher introduced the distinction between artistic and core form.[60] This distinction allowed Bötticher to take up Aristotle's matter-form relation, to translate it using a vocabulary that was adequate for architecture, and to introduce the concept of tectonics into architectural theory. Whereas functionalism and materialism tend to a reductive understanding of architecture, the term 'tectonics' stands for the idea that architectural construction has both a static function (a core form) as well as a poetic function (an artistic form), enabling the construction to become the bearer of a sensible-poetic architectural expression through a surplus of form.

But the aesthetics of architecture was threatened by industrial innovation. Manual labour became superseded by machine labour in more and more sectors, not only in the factory, but also on the construction site. Semper saw this as a danger for architecture, which in his view depended not only on the will of the architect, but also on crucial impulses from the independent will of the matter. Unsurprisingly, he referred to Schopenhauer, who had already argued that the aesthetic experience of art consisted of 'two inseparable components [...]: cognition of the object [...] and then the self-consciousness of the one who has this cognition'.[61] Semper argued, similarly, that architecture originates out of the will of the architect as well as the will of the matter. Matter inserts itself into architecture independently, by opposing the ideas of the architect, while at the same time functioning as their medium.

Semper feared, however, that matter would capitulate before the machine:

> The hardest porphyry and granite are cut like chalk and polished like wax. Ivory is softened and pressed into forms. Rubber and gutta-percha [i.e. latex – JG] are vulcanized and utilized in a thousand imitations of wood, metal, and stone carvings, exceeding by far the natural limitations of the material they purport to represent.[62]

According to Semper, the machine destroys the self-will of these materials. The will of these materials is broken by the machine and the latter can do anything with them. Architecture is, as it were, *dematerialised*, as soon as the boundless possibilities for processing the materials disturbed the equilibrium, or the dialectical tension between the self-will of the material and the formative will of the architect. The annihilation of the self-will of the material is, according to Semper, just as much an attack on architecture as it is on the architect.

A separate crisis emerged due to the introduction of iron as a construction material, as its self-will as well as its architectonic potential was yet to be discovered. Moreover, iron seemed to contradict the ideal of architecture as the art of monumental building. Iron did not permit the same kind of monumentality that was possible with stone. Characteristic of the will of iron is that it be utilised in thin profiles, so that construction tended to become invisible. For iron, escapes the eye all the more 'because of the small surface area that it offers in these forms [...] the more perfect its construction is'.[63] This is also why Semper called iron 'invisible matter', whose very invisibility denies any aesthetic effect.

Nevertheless, Semper was not tempted to fall into naïve cultural pessimism, and did not categorically dismiss new materials such as iron and glass. It is true that Semper saw in these 'appearances the decline of the arts' and processes destined to destroy the old life of art. He nevertheless hoped that, through a 'mysterious phoenix-like rebirth', the arts could be reawakened with new splendour. He even seemed to foresee the architectonic potentials of iron, when he remarked:

> It will be a long time before iron, and metal in general, will be mastered so completely that it can claim the kind of legitimacy and respect that puts it next to stone, brick, and wood within the fine art of building.[64]

Schopenhauer, too, had asked what could be the architectonic potential of iron, which is not immediately knowable in its status as a raw material, in the way that it is produced. In the same way as with stone, he asked what iron essentially wants and how this could come to appearance and be known in an architectonic shape. Schopenhauer concluded that, corresponding to the 'tenacity of iron', the architectonic potential and aesthetic functioning of iron had to be different from that of stone. Corresponding to iron's own self-will,

Schopenhauer argued that new proportions had to be found, different from those 'which have been judged best for stone buildings and their parts'.[65] Thus, he speculated that for 'the fine art of building from iron, different architectural order of columns' needed to be found.[66]

In fact, it took more than a century and a half after the first experiments with iron greenhouses (built in England at the start of the 19th century) before in 1958 Ludwig Mies van der Rohe's Seagram Building was completed in New York. Here, the 'tenacity' of iron, or rather steel, was finally exemplified and its architectonic potential was given an aesthetic effectiveness of monumental proportions. The high rise, a new type of building invented by the modern age, shows exemplarily both the constructive as well as aesthetic potential of steel. Mies van der Rohe's Seagram Building exemplifies the new rules – we may also speak quite simply of the elements of the modern style – or, to echo Schopenhauer, the 'different architectural order of columns' for building with steel and glass.

VIII. CONCLUSION

As Heinrich Wölfflin put it, long after Semper, Bötticher, and Schopenhauer, the 'excess of Form Force' and the 'opposition of Matter and Form Force, which moves the entire organic world, is the basic theme of architecture'.[67] Everything is form bound by matter. The same holds for the development of architecture in the 20th century – whether this be high modernist, constructivist, informal, or deconstructivist architecture. It even holds, today, for architecture in which the form is often no longer the result of a formative transformational process, but in which artificial materials are rather on the contrary developed under laboratory conditions.

The point of departure and the primary example, however, remains Aristotle, who already in his *Metaphysics* thematised synthetic or artificially created materials. There he does not just mention stone or wood, but he also discusses bronze from whence statues are created.[68] Bronze is an alloy composed of different metals which has material qualities that cannot be found among naturally occurring metals. Here, the material qualities necessary for the production of bronze sculptures are the point of departure for developing a material that must first be invented. Aristotle's hylomorphism is therefore not limited to naturally occurring matter, but applicable also to synthetic materials. This makes it compatible with contemporary discussions regarding new materials in architecture, such as e.g. composite building materials or building materials produced from fungi.

An aesthetics of architecture can only be developed from that which is the basis of architecture itself: the surplus of form. This is the precondition for the malleability of matter, and therewith the possibility of architecture. As has been made clear with reference to Aristotle, however, the surplus of

form is not bound by a reduction of architecture to the art of building, even if a formative will that is both opposed to, as well as collaborating with, the will of the material is always a prerequisite.

joerg.gleiter@tu-berlin.de

NOTES

[1]Translated by Clinton P. Verdonschot. Note on the translation: wherever possible, I have tried to find published translations of the works cited here. In some cases, where a translation proved impossible to find, I have done the translation myself.

[2]Aristotle 1937, 10.687a.

[3]Arendt 1998, 12.

[4]Arendt 1998, 9.

[5]*Utilitas*, *firmitas*, and *venustas* (translated here, respectively, as functionality, good construction, and aesthetic appeal) are the foundational categories of architecture, as proposed by Marcus Vitruvius Pollio in a prominent passage of the only ancient treatise on architecture to have survived, Vitruvius 1999.

[6]Kant 2000, 5:204.

[7]Kant 2000, 5:211.

[8]Kant 2000, 5:219.

[9]Kant 2000, 5:236.

[10]Kant 2000, 5:240.

[11]Kant 2000, 5:203.

[12]Kant 2000, 5:205.

[13]Kant 2000, 5:204.

[14]Kant 2000, 5:203.

[15]Kant 2000, 5:204.

[16]Kant 2000, 5:205.

[17]Kant 2000, 5:207.

[18]Kant 2000, 5:205.

[19]Kant 2000, 5:225.

[20]Kant 2000, 5:225.

[21]Kant 5:226.

[22]Alberti 1988.

[23]Alberti 1988, bk. 1, par. 1.

[24]Vitruvius 1999, bk. 1, ch. 2, par. 2.

[25]Barbaro 2019, 19.

[26]Barbaro 2019, 19.

[27]Alberti 1988, bk. 1, par. 1.

[28]Alberti 1988, bk. 1, par. 1.

[29]See above, notes 16 and 17.

[30]Kant 2000, 5:320-325.

[31]Kant 2000, 5:320.

[32]Kant 2000, 5:320.

[33]Poetry and rhetoric occupy the top spot, since according to Kant, they, like words, articulate ideas the clearest of all, and thereby best incite a play of the imagination that enlivens the mind (Kant 2000, 5:321). Music and 'the art of colors' (5:324) occupy the lowest rung, since (again, according to Kant) they characteristically concern themselves with the composition of mere tones. Kant does not explain what he means by the art of colours, apparently a different genre than painting. I believe we can approximate his understanding by thinking of a colourful painting by William Turner, or somewhat closer to Kant's own time, a ceiling painting of clouds by Giovanni Battista Tiepolo. In these images, it is not the lines or forms that are important, but simply the pleasant, modulating way in which the colours affect us.

[34]Kant 2000, 5:320.

[35]Aristotle 1924, 1042a.

[36]Aristotle 1924, 1042a.

[37]Aristotle 1924, 1037a.

[38]Gehlen 1988, 237.

[39]Aristotle 1924, 1033a.

[40]Aristotle 1924, 1041a.

[41]Aristotle 1924, 1043a.

[42]Aristotle 1924, 1043a.

[43]Aristotle 1924, 1043a.

[44]Schopenhauer 2018, 427 (*SW*, 468).

[45]Schopenhauer 2018, 425 (*SW*, 466).

[46]Schopenhauer 2010, §43, 238 (*SW*, 251).

[47]Schopenhauer 2010, §43, 239 (*SW*, 252).

[48]Schopenhauer 2010, §43, 239 (*SW*, 252).

[49]Schopenhauer 2010, §43, 239 (*SW*, 252-253).

[50]Schopenhauer 2010, §43, 239 (*SW*, 252).

[51]Schopenhauer 2018, 428 (*SW*, 468-469).

[52]Schopenhauer 2018, 433 (*SW*, 474).

[53]Incidentally, the idea that art develops from the tension of material and artistic will was much celebrated among the artists of Schopenhauer's time. Richard Wagner, for instance, explicitly acknowledged Schopenhauer's influence in moving him from a narrow Romanticism to a conception of the Gesamtkunstwerk. Schopenhauer's effect on Wagner was, in the latter's own words, 'extraordinary, and in any case decisive for my entire life'. See Wagner 1937, 208.

[54]Schopenhauer 1985, 136.

[55]Schopenhauer 2010, 242 (*SW*, 256).

[56]Schopenhauer 2018, 431 (*SW*, 472).

[57]Semper 1989, and Bötticher 1852, translator's note: the title of the work translates as 'The tectonics of the Greeks'..

[58]Müller 1847.

[59]Bötticher 1852, XV.

[60]Translator's note: i.e. between *Kunstform* and *Kernform*.

[61]Schopenhauer 2010, 219 (*SW*, 230).

[62]Semper 1989, 134.

[63]Semper 1966, 22.

[64]Semper 1966, 22.

[65]Schopenhauer 1985, 139.

[66]Schopenhauer 1985, 139.

[67]Wölfflin 1994, xx.

[68]Aristotle, *Metaphysics*, 1013b.

REFERENCES

Alberti, Leon Battista. 1988. *On the Art of Building in Ten Books*. Translated by Joseph Rykwert, Neil Leach, and Robert Tavernor. Cambridge, MA: The MIT Press.

Arendt, Hannah. 1998. *The Human Condition*. Chicago: The University of Chicago Press.

Aristotle. 1924. *Metaphysics*. Translated by W.D. Ross. Oxford: Clarendon Press.

———. 1937. "Parts of animals." In *Parts of animals. Movement of animals. Progression of animals*. Translated by A.L. Peck and E.S. Forster. Cambridge, MA: Harvard University Press.

Barbaro, Daniele. 2019. *Daniele Barbaro's Vitruvius of 1567*. Edited by Kim Willams. Translated by Kim Williams. Cham: Birkhäuser.

Bötticher, Karl. 1852. *Die Tektonik der Griechen*. Potsdam: Ferdinand Riegel.

Gehlen, Arnold. 1988. *Man: His Nature and Place in the World*. Translated by Clare McMillan and Karl Pillemer. New York: Columbia University Press.

Kant, Immanuel. 2000. *Critique of the Power of Judgment*. The Cambridge Edition of the Works of Immanuel Kant. Edited by Paul Guyer. Translated by Eric Matthews. Cambridge: Cambridge University Press.

Müller, Karl Otfried. 1847. *Ancient Art and Its Remains; or a Manual of the Archaeology of Art*. Translated by John Leitch. London: A. Fullarton and Co.

Schopenhauer, Arthur. 1985. *Metaphysik des Schönen*. Edited by Volker Spierling. München und Zürich: Piper.

———. 2010. *The World as Will and Representation*. Volume 1 of *The Cambridge Edition of the Works of Schopenhauer*. Edited by Judith Norman, Alistair Welchman, and Christopher Janaway. Cambridge: Cambridge University Press.

———. 2018. *The World as Will and Representation*. Volume 2 of *The Cambridge Edition of the Works of Schopenhauer*. Edited by Judith Norman, Alistair Welchman, and Christopher Janaway. Cambridge: Cambridge University Press.

Semper, Gottfried. 1966. *Wissenschaft, Industrie, und Kunst und andere Schriften über Architektur, Kunsthandwerk und Kunstunterricht*. Edited by Hans M. Wingler. Mainz und Berlin: Kupferberg.

———. 1989. *The Four Elements of Architecture and Other Writings*. Translated by Harry Francis Mallgrave and Wolfgang Herrmann. Cambridge: Cambridge University Press.

Vitruvius. 1999. *Ten Books on Architecture*. Translated by Ingrid D. Rowland. Cambridge: Cambridge University Press.

Wagner, Richard. 1937. *Die Hauptschriften*. Edited by Ernst Bücken. Leipzig: Alfred Kröner Verlag.

Wölfflin, Heinrich. 1994. "Prolegomena to a Psychology of Architecture." In *Empathy, Form, and Space: Problems in German Aesthetics, 1873-1893*. Translated by Harry Francis Mallgrave and Eleftherios Ikonomou. Santa Monica, CA: Getty Center for the History of Art and the Humanities.

Aesthetic Investigations is a peer-reviewed open access journal published by the Dutch Association of Aesthetics.