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This publication represents a summary of our three-year Erasmus+ partnership involving three universities - the Amsterdam Academy of Architecture, the Mackintosh School of Architecture in Glasgow and the University of Liechtenstein - which was funded by the EU to examine building envelopes against the backdrop of varied architectural traditions. The aim of the project partnership was to generally promote a structural and material examination of our European buildings, not only focusing on architectural and constructional issues, but also allowing cultural, social and economic aspects to flow into the work.

Today, an increasing number of factors determine the configuration of an aesthetically and functionally high-quality building envelope, above all the requirement for first-class quality in terms of energy use. As such, it has become difficult today to obtain architectural form from the logic of one single building material. The architectural task is rapidly breaking up into highly diverse, particular technical subjects that are clearly manifest in the complex configuration of façades. While the individual layers resolve their respective task discretely and brilliantly, their interplay with one another often reveals the fundamental shortcomings of material expression. By letting go of what were formerly inseparably unified categories in architecture, we are faced today with the threat of losing the culture of building, and the difficulty of establishing a coherent architectural language from construction becomes apparent.

By choosing the materials stone, brick and wood, we placed a clear focus on the building traditions present in the three countries. We analysed existing buildings, constructive elements and façade materials, examined artisanal traditions and technical aspects, and learned from our vernacular buildings in order to draw lessons for the future. Against the backdrop of climate change and the imperative to build in a way that saves resources, these topics enable us to redefine how existing and new building envelopes shall be treated, thus fulfilling the European Commission's long-term goals for creating intelligent, sustainable and resource-efficient projects and, in the process, enriching the European discourse.

The design studios were at the heart of the project partnership, complemented by joint workshops and joined together to make up a new whole. Each of the three project partners was responsible for the content and organization of one design task, which was then carried out jointly. In this way, an important architectural, cultural and social exchange took place within the European educational landscape. In times of internationalization, this represents a valuable contribution towards raising awareness of our building culture and is of great importance, both in teaching and in the building industry, as well as in the area of politics. The symposium held during the term of the project also made our experiences and outcomes available to interested parties outside of the project partnerships.

This publication makes no claim to be complete, and it should instead be understood as a contribution to the discussion concerning façades. It serves to enrich the current European discussion about building envelopes and their importance within the context of technology, building culture and the social realm.

Material, Scale and Drawing

Urs Meister

If the human being is the measure of all things when it comes to our sensory perception of the world, and if neither the notion of space nor that of architecture would exist without humans, then scale is what puts us in relation to the world of things. Scale gives us a visual reference with relation to space. Scale enables architecture to be immediately deciphered, thus giving us orientation in space. While the units of measurement, at least in Europe up to the period after the French Revolution, were lingually connected to human physiognomy through terms like ell, foot and span, the introduction of the metre did away with this relationship. Nevertheless, the inseparable link between our human bodies and the buildings and spaces around us lives on in the architectural scale.

Control over space

The Dutch monk and architect Dom Hans van der Laan developed his own theory about the scale of things, which he implemented in the monasteries he built. About this, Caroline Voet writes:

We 'read' our environment by relating objects to each other, by comparing and differentiating. If we understand by seeing, then we do this by measuring and gauging. We intuitively estimate the size of something by choosing a yardstick in the space and using it as a foundation for 'counting' this space.¹

The 'yardstick' is the measure of all things that we recognize, and between which we make connections. Whether in the tartan pattern of a fabric or the layout of a town, Van der Laan discovered and deciphered equal measures of rhythm and density in both. Fibre, thread and fabric are three stages in a production process that he likewise saw in architecture. "The fibre disappears into the thread, and the thread, in turn, into the cloth."² Variations in proportion and colour ultimately make it possible to reach a visual balance in the composition of the fabric, and this also applies when translated to achieving balance in a façade. It is not without reason that Van der Laan built his monasteries using brickwork, albeit with a whitewashed finish, in order to place the main focus on the ratio of masonry to opening. His absolute devotion to dimension, proportion and form ultimately led to his almost religious 'trinity' of space, form and measure. Using scale, he forged a connection between physical experience, sensory perception and intellectual knowledge of the gauging of space, and by so doing he ultimately formulated the human desire to gain control over space.

What a façade can tell us

A well-assembled façade allows us to intellectually penetrate the pores of the material, giving us points of reference from where we can continue to imagine the relationships between the parts. To do this, we must be able to see them from varying distances. From the perspective

of the whole, where the façade must assert itself as part of the city with a characteristic expression that sets the building apart from its neighbours, and yet still allows it to enter into a dialogue while remaining distinct. From close up, where the parts of the building take advantage of their material qualities and reveal an internal order via the nature of how they are joined. And, finally, from inside, where openings share and regulate the connection to the urban or landscaped space outside. But we need an intermediary between our body and the building. The architectural detail can serve to translate the thing into a perception and offer points of reference for our eyes, which would otherwise helplessly scour the surfaces without deriving depth. The clever detail makes demands on us, reveals the characteristic and, in the best case, bears within its nucleus the essence of the whole. Thus paying attention to an articulated interface between two building parts, a well-produced transition from wall to opening, or a relief-like accent in the surface, makes profound sense in human terms. Seen from this perspective, 'Crafting the Façade' sheds light on the topic from two angles: from the production of the façade and its design on the one hand, and on the other, from the perspective of the observer, who has a right – with the help of the façade – to be able to read and understand the building. 'Crafting the Façade' aimed to grasp the façade as texture, on the level of which architecture is used as a means with which to weave a complex story from the relationship between components that are linked to one another.

The scale of the material

In its scale, *brick* is per se subject to the measure of the human hand, and also to the physical possibilities of the bricklayer (weight) and the conditions of production (firing process in the kiln). It is hard to imagine another material that has remained so consistent in its size as brick, and today's modern product is still very similar to the adobe or mud brick that is still made by hand throughout the world. The scale of *timber construction* comes from the dimensions of the tree trunk, which in pre-industrial times was processed by hand. In old log cabins, the heights of the horizontal timbers often vary depending on what could be cut down in the nearby woods. Although the timbers were also sequentially numbered so that entire buildings could be relocated, the wood used for building was, to the greatest extent possible, cut down, stored, processed and used locally. The scale of the tree trunk is, however, only recognizable and present in massive timber. Industrially processed wood such as glued laminated timber and plywood boards, due to the transverse veneering of the trunk and the lengthwise finger-jointing, and ultimately due to modern adhesive bonding techniques, is standardized in all its dimensions and structurally calculable, but has, as it were, come to also be without scale – we could also refer to it as domesticated timber. A *stone* building, by comparison, has always been bound by transport dimensions that had to be observed from the quarry to the building. Each of the three materials has its own inherently traditional local aspect. Faced with limited transport options, there was an advantage in proximity between the building site and the place where the materials were obtained and processed. This means that, almost inevitably, a local culture decisively shaped the face of places. The dark brick along Amsterdam's canals, rather small-scale when compared to its Central European counterpart, reflects a distinctive and characteristic chromaticity and scale, just as much as do the vivid, red sandstones of Glasgow's gridded streets or the robust, sunburnt fir wood of Alpine buildings.

Unlike concrete, these three materials have an integral component of scale that is directly linked to how they are processed and made, with their production. Concrete can be poured without any size restriction, thus concealing how it is made. It was not without reason that, even with the Brutalism of the 1960s, the formwork for concrete buildings was given a very 'close' scale by using roughly sawn planks that, besides having a small scale (plank size, wood grain) also reveal the production process of forming and casting. Modern formwork for exposed concrete allows this to be suppressed completely. The architecture of brick, stone or wood, by comparison, profits directly from the conditions of production, which are at best revealed and manifested in how the façade is

- 1 Caroline Voet, *Dom Hans van der Laan: Tomelilla*, Architectura & Natura Press, Amsterdam 2016, p. 29.
- 2 Dom Hans van der Laan, in a lecture in 's-Hertogenbosch, 1968 (Voet, 2016, p. 84).

Drawings 1:10

articulated and in the tectonics of its assembly. If Ruskin's expectation "see if it looks as if it had been built by strong men; if it has the sort of roughness, and largeness, and nonchalance, mixed in places with the exquisite tenderness which seems always to be the sign-manual of the broad vision"³ still remains valid today, then it does so in these direct opportunities to generate expression from the materials.

Crafting the drawing

What determines the quality of a hand-drawn plan? What differentiates it from a digitally generated drawing? Is it the slow process of working on a drawing, which initially lies in front of you as a blank sheet of paper that must be filled? It is a strenuous path that goes from laying out the first guide lines, which divide up the sheet of paper and later make the various relations tangible, to the final stroke, which must be perfect for it to appear precise. Once the drawing itself has been laid out, the building parts in section are then outlined and filled in, and lastly, the areas in elevation and their jointing patterns are added. It is a process of working in layers that are laid one upon the other to produce the complexity of the drawing step by step. The drawing produced by hand – particularly in large scale – must be constructed according to its own logic, almost like a real building. Thus the drawing helps us to understand the actual building that is depicted. Drawing by hand entails erasures and corrections, which – unlike undo and redo commands – inevitably leave traces. Traces that, however, at best enhance the depth of the drawing and can underscore the sharpness that is naturally desired with a vagueness that serves to increase one's perception of precision. A CAD drawing cannot contain any vagueness, thus making it a perfect aid for digital workflows. This is most succinctly evident when working with BIM, where the drawing no longer exists as an artefact, but at most as a mere portrayal of the digital model. Building integration modelling has dramatically heralded the end of the drawing and relies on the networked intelligence of many things that are supposed to work together. Thus the cumbersome character of the drawn plan would, at first glance, seem to be obsolete. But it remains unclear as to how architecture's expression can still be assessed in this supposedly perfect world. The handcrafted drawing is, after all, not merely a portrayal; it is indeed a key to understanding a building. The culture of drawing goes far beyond just basic representation, reflecting architecture in its fundamental essence.

The scale of the drawing

Scale places us as human beings in relation to the things that already exist or those we are designing. We use drawings, models or prototypes as tools for communicating between ourselves and the world. In this function as intermediary, the scale plays a very important role. Choosing the scale to be used at the communication level is crucial and represents a clear decision in favour of a specific perspective, in favour of a particular focus. It was therefore a matter of great importance for us to increase the drawing scale and the size of the drawings. The drawing's scale of 1:10 has the advantage that not only the detail can be explored but, thanks to the oversized drawing paper, the entire façade can be depicted and contemplated. The detail represents a focus within the drawing as a whole. The large drawing formats accommodate not only the accumulated knowledge of the small things, of how the building components are joined and how they come together, but also the presence of the entire building and how the parts relate to the whole. The same also applies to physically constructing prototypes and models at 1:1 scale. Here the body is addressed, and in a best-case scenario, in this way a part of the whole can establish a relationship to us, both close up and from a distance. Last but not least, producing large-scale drawings is physical work. It involves the body. The act of perception goes beyond just looking, and the body becomes integrated in the process by doing, by crafting. This is extraordinarily interesting for us: designing architecture is no longer understood as a purely intellectual activity, but is in this way given a reflexive, corporal dimension.

Stone

10–17.10.2015
Glasgow

Brick

12–15.03.2016
Amsterdam

Wood

8–10.10.2016
Vaduz

During three workshops in Glasgow, Amsterdam and Vaduz, students of the participating studios made 1:10 detail drawings of the façades of selected buildings. The researched examples stand for different building traditions: the building blocks of the grid of Glasgow's city center entirely made of stone, the Amsterdam school's expressive brick façades or the urban vernacular of the traditional wooden buildings of the Städtli Werdenberg in the Rhine valley near Liechtenstein. Large scale drawings were finally used in the design studios in order to transport the knowledge of the previous research phase into the project work of each student and to cultivate the power of hand drawing as a design tool.

The big drawings were essential in helping students to gain insight into the qualities of the façades and the used materials. We came to understand that working at a large scale echoed the difficulties of working with stone, brick and wood. In the process, we discovered the value of the drawing as a crafted object unmediated by the computer. The selection underlines the role of drawings as instruments of knowledge that fuse the conception and construction of buildings and offers a fundamental insight into the crafting of stone, brick or wooden facades *and* making a hand-drawing.

3 John Ruskin, 'The Nature of Gothic', in: *Stones of Venice*, 1853.