One and Many Details

Considering the Contingencies of Building as Empirical Evidence for Architectural Pedagogy

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One and Many Details: Considering the Contingencies of Building as Empirical Evidence for Architectural Pedagogy

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ROOMS
Classroom
OBJECT TYPES
Lecture / Talk Presentation
FORMS OF TACIT KNOWLEDGE
Collective Tacit Knowledge Embedded Knowledge
GLOSSARY TERMS
Architecture Craft Design Process Material Culture Pedagogy

The architect's problem is not how to found his knowledge positively but how to make his knowledge grow. [1]

– Stanford Anderson

The study of built objects has always played a key role in the education of the architect. At the earliest stages of training most of us sat in front of buildings and drew them, trying to capture their overall features and minute details. What appears simple is, in fact, an extremely meaningful exercise. It presumes that drawing an existing object allows us to understand what decisions were made in its conception, granted that evidence of those decisions is actually there, congealed as empirical evidence and available for further use. [2]

As students advance in their studies, this close attention to objects and the decisions that define them gives way to more complex reflections. Final year students seldom sit in front of buildings and draw them. Their fascination with societal issues and formal innovation seems to leave little room to ponder on the apparently simple ways in which materials come together. Likewise, interest in the built as a source of knowledge appears to wane among faculty who inclined towards fashionable forms of scholarship outsource technological research and education to engineers and other pragmatists. [3]

While architectural education's turn towards the humanities offers new and exciting possibilities, the relegation of the built to a mere problem-solving role is not without its consequences. Among them, perhaps the most unfortunate outcome of assuming

construction as applied, externally produced knowledge, is that it robs us of rare and precious insight that is ingrained in the built.

Looking for that insight, we will describe how a design studio can use construction as a means for students to produce and develop their own architectural knowledge. Our description will be favored by an outline of the supporting theory, the epistemology we used to operate it, and the methodology employed to teach the course. Throughout a ten-week period, we accompanied a group of sixteen master's students in their process of exploration, evaluation and discovery of four details from existing buildings. Our goal, and the challenge we presented to the group, was to obtain from these details a theory and a new design. 4

Architecture as a cognitive, collective practice

Our proposal to research the built from the design studio is based on our understanding of architecture as a cognitive, collective practice. 5 Indivisible from our research and production as architects, the education we offer focuses on the ways in which the instruments and methods of architecture determine the growth and development of our knowledge of the built environment. 6 This focus is evident in the three design studios we run at the masters' level of education, and in the sequence they follow.

The first of these studios invites students to explore a diversity of instruments and methods of architecture (e.g. mapping, narrative texts, scale models), and to evaluate their use to develop an urban intervention. A second studio evaluates these and other instruments and methods by confronting them with those of other disciplines; 7 while the final, diploma studio encourages each student to adopt a position in relation to context, theories and épistémès, and disciplinary precedents, via the selection and use of a discrete set of instruments and methods. 8

In all cases, these instruments and methods operate within four fields of exploration, evaluation and discovery of the built environment, or heuristics, namely: (a) form, or buildings' geometries, configurations, etc., (b) use or purpose, dealing with the intentions that generate buildings, and their performance in relation to human activities, (c) communication, related with how buildings are re-presented and their conveyed meaning, and (d) technique, understood as the resources, processes and procedures required to materialize them. 9

It is customary for graduation projects from our studios to focus on the relations between architectural form and its social and political consequences (i.e. its use or purpose). A typical graduation presentation develops an analysis of the natural and

cultural conditions that characterize the intervention's context, and positions itself in relation to a series of concepts that envision a possible future for that context. On these grounds, a purpose for a project is justified, and a particular use is envisioned. Furthermore, existing architectures are recognized as the source of project strategies. The analysis of these precedents, together with the synthesis required to appropriate their strategies, is mostly morpho-typological (i.e., formal).

The depth with which students examine use and form is not commensurate with their study of communication and technique. Students work hard and produce amazing drawings and models, but these are seldom taken as investigations in their own right. Rather, a homogeneous communication strategy can be recognized in most projects, often emulating drawings from well-known architecture offices. [10] Underlying stylistic differences is a small repertoire of basic instruments and methods of representation: floor plans, cross-sections, perspectives, drawn with CAD programs and enhanced as collages.

A similar attitude characterizes technical and technological approaches to design. On the one hand, decisions regarding building's different technical systems and the materials required to build and operate them are explained with remarkable simplicity. For instance, after defining a load-bearing solution and distributing a project's service networks, a common presentation includes one or two slides in which a "palette" of materials (e.g. terra-cotta, wood, weathering steel) is advanced as a technical decision. While these materials are picked for aesthetic reasons, their use is justified in relation to efficiency and context; mimicking local buildings' appearance, or ascribing particular traits to a material (e.g., wood is warm, steel is light, etc.) are assumed as sufficient explanation for complex technical decisions.

Once general decisions have been made, students dive into what they dub the 'technical part' of their work, where they develop a few aspects of their projects with a higher degree of precision. Common examples of the technical part are system drawings, in which climate control or environmental performance are explained, or large scale cross-sections of special or typical joints. As with communication, building technology is seldom seen as a unique form of inquiry for architects.

Concerned with these shortcomings we became interested in stimulating a cognitive approach to architectural technique from our design courses, and decided to direct the spring 2020 version of our MSc2 studio Transdisciplinary Encounters towards the exploration, evaluation and discovery of the built. Not only is this the most flexible and

experimental of our studios; some ground had already been treaded in this direction in a previous edition of the course, in which a small wooden edifice was constructed.

Besides, an exciting research possibility appeared, with the opening of the PhD program Communities of Tacit Knowledge, where we participate among ten partner institutions. [11] From the PhD candidates who started investigating different forms of tacit knowledge in architecture, the researcher assigned to our institute is keen on material culture and craft, and arrived with a host of practical knowledge as an architect, carpenter and welder. He was invited to join the studio.

Animated by these possibilities we launched our studio in April 2020, aiming to study the instruments and methods of architecture in relation to materials and construction. This, of course, was not an original intention. Albeit absent from our curriculum, we recognized that many architects had already reflected on materials and technique as sources of knowledge in useful and powerful ways.

Organized systems of ideas for the study of material culture and craft

The studio originally contemplated a double agenda. A first part would be devoted to the study of relevant texts and the analysis of construction details (45 cm2 samples) from canonical buildings in Rotterdam to illustrate aspects of the texts. A fragment of Ad van de Steur's complex masonry for the Bojmans van Beuningen museum, for example, could exemplify Gottfried Semper's theory of architecture as a textile art; [12] while a joint between that masonry and the stone plinth of the museum could clarify Edward R. Ford's reflections on inter-scalar mediation.

Aside from four seminars, two visits were planned: one to Studio Ossidiana, where students would learn from the office's trajectory and research of materials and craft; and another to the laboratories at our University's Faculty of Engineering and Geosciences, where they would get acquainted with the ways in which materials' performance is appraised. Towards the end of the studio, we planned an excursion to Chiojdu, a commune in central Romania, famous for its traditional houses.

There, our students would work with local colleagues in a two-week program. [13] Throughout this period, the group would receive basic technical instruction from experienced craftspeople and, using that knowledge, build an exhibition space for rural artefacts. Faithful to our transdisciplinary ambition, we intended to confront the instruments and methods of architecture with those of ethnography. Consequently, the final assignment of the course was envisioned as a comparative analysis of Dutch and

Romanian architecture cultures, based on the analysis and the practical development of architectural details.

All our plans changed suddenly due to COVID-19 restrictions. Unable to travel or meet, we quickly adjusted the program to focus solely on the analysis of a few architectural details, understood as a repository of knowledge. Forced to shed our broader ambitions, we remained convinced of the importance of positioning the questions and insights contained in the built as indispensable to our understanding of architecture.

As planned, we read Semper's theory, based on the notion that 'every technical product is a result of purpose and material', [14] and also Bernard Cache's further developments on it, to make clear that it is not only possible, but indispensable to assume theories as live entities that must be constantly upgraded, or challenged. [15] Kenneth Frampton's Studies in Tectonic Culture allowed us to reflect on the cultural consequences of construction. The idea that building conveys meaning, developed in his study of Carlo Scarpa's work, was met with strong criticism by the group, who identified glaring contradictions in its conclusions. [16]

To provide some sense of continuity, we read two alternative approaches to the work of Scarpa. Michael Cadwell's Strange Details presented us with a multi-layered method to communicate building decisions. [17] His tour around Scarpa's gallery for the Venetian Querini Stampalia Foundation is registered as a series of overlapping representations, able to convey the diversity of information contained in its details. [18] Marco Frascari's 'Tell-the-tale Detail,' on the other hand, invited us to ponder on the important distinction that exists between material and representational production. His claim that "the architectural detail can be defined as the union of construction, the result of the logos of techné, with construing, the result of the techné of logos" [19] was of special interest to some of our students, as we will see.

Finally, we studied Edward Ford's efforts to define the architectural detail by describing what it does, rather than what it is. [20] And what it does, according to Ford, is mediating abstraction and empathy, as it negotiates human (cultural, empathic) and non-human (natural, abstract) scales.

Besides these readings and the seminar discussions which they fueled, we organized three lectures with nuanced and exciting approaches to the architectural detail. The first, by Aleksandar Staničić, focused on the relation between materials, construction and memory, through an review of the 911 memorial in NY. [21] Following, Marko Jobst analyzed the role of craft in the work of five artists, whose work affects and reflects on matter and construction. [22] Finally, Alessandra Covini, head of Studio Ossidiana,

elaborated on the nature and ambitions of her practice, which – said before – is driven by the exploration of materials and construction as a source of revelation and discovery. Jointly, readings, seminar discussions and lectures generated an environment of curiosity and confidence in the possibility of studying the architectural detail, and the materials, processes and procedures involved in its construction, as a valuable source of architectural knowledge.

Instruments and methods for the appraisal of the built

While planning the studio, we were constantly faced with a pressing question: How can we appraise the value of the built in cognitive terms? To confront it we relied on Giancarlo Motta and Antonia Pizzigoni's 'project machine', a methodology that springs from, but is not limited by the Italian neo-rationalist tradition. [23] 'The role of the machine – the authors note – is first and foremost, to make transmissible everything concerning the project's procedures.' [24] Among these procedures are the structural study of form, the abstraction of cartography, the definition of program and the recognition of the many discourses that determine architecture, examined through the lenses of memory, reason and imagination. [25]

While the formulation of the machine is rather complicated, and issues in a series of 'project grids' to classify information, we decided to use one of its simplest features, which illustrates the productive interrelation between analysis and project. Drawn within d'Agincourt's plan of Alberti's Tempio Malatestianio in Rimini, Motta and Pizzigoni propose a circular cognitive process, which loops between the presence of tangible objects and the absence of abstract ideas. [26] Via induction, abstraction or analysis, in one direction, and deduction, concretion or synthesis, in the other, the cognitive process sketched in the loop is marked by a succession of instances in which a particular instrument or method must be utilized to unlock the knowledge required to evolve in the desired direction. [27] (Fig. 1)
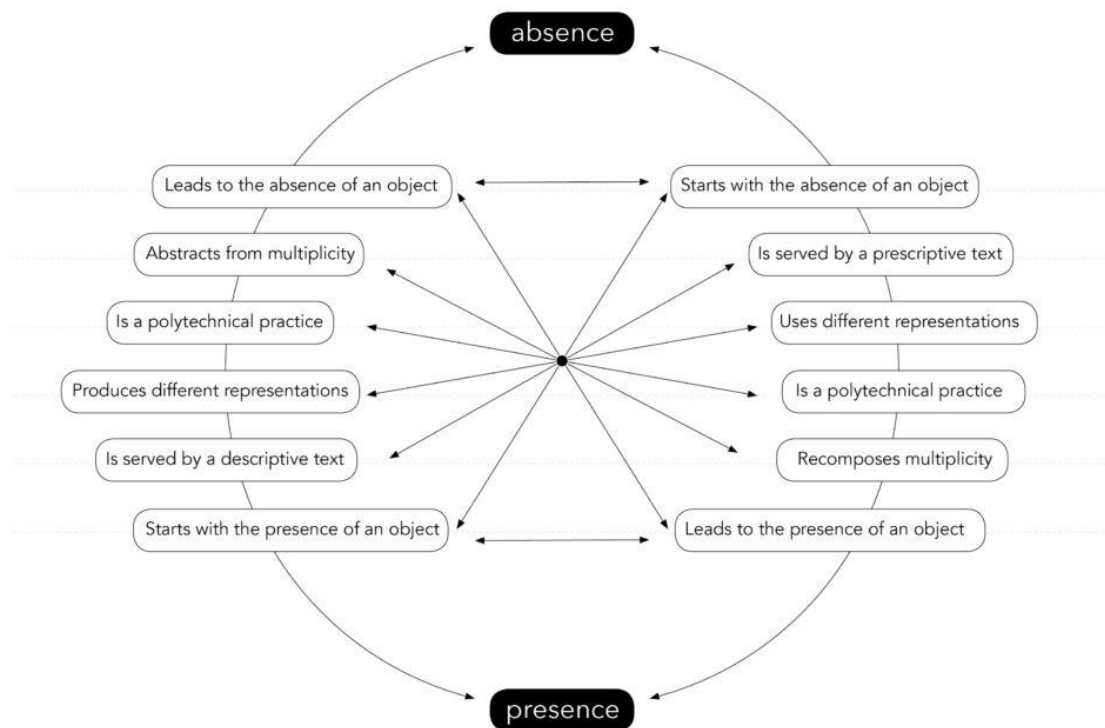
Figure 01: Diagram of Motta and Pizzigoni's circular cognitive process

The analytical or inductive trajectory of the loop starts with the presence of an object that can be explored empirically. Analysis is favored by a text, in which the object is comprehensively and accurately described. The object is then dissected using a diversity of representations, which recognize the polytechnic nature of architecture. [28] From this multiplicity of techniques analysis is served by abstraction, or the attempt to focus on one, among the many aspects that define a particular built reality. This process of abstraction leads to the absence of the object initially contemplated, or its replacement by a concept, as the outcome of the analytical process.

Indivisible from the analytical trajectory, the architect engages in a synthetic process, which departs from that absence and follows the same steps, albeit in inverse order (and using a prescriptive, rather than a descriptive text), in order to materialize abstract knowledge into a new presence: an object that both embodies conceptual knowledge and tests its application in a particular context.

Over the last years, the use of this loop had important consequences in our academic work, for two important reasons. On the one hand, it dissolves the illusion of research and practice as disconnected or even opposite instances in the architect's work,

suggesting insted that, when seen as a cognitive practice, architecture depends on knowledge produced simultaneously by induction and deduction. This movement also suggests that analyzing or constructing buildings are as indispensable to learn about the built environment as reading, designing and thinking. The fact that several instruments and methods appear on both trajectories of the loop, albeit in different positions, ratifies the interdependence of these activities and their dialectic nature.

Besides the dissolution of the research/practice dichotomy, the use of the 'project machine' allows for the study of architecture at three levels of cognition. Its very name – a machine – suggests a methodology; a rational articulation of the instruments and methods of architecture in a particular order, with a clear program in mind. In turn, this choice implies the ascription to a discrete organized system of ideas, of which the instruments and methods are part of. As part of different épistémès, for example, a descriptive text focused on the structural configuration of the analyzed object (presence) will yield entirely different conceptual results (absence) from those obtained by another text that tries to capture the atmosphere of a place. 29

While the loop operates at the methodological and epistemological levels of cognition, its outcome is theoretical. Making sense of ideas, actions and objects simultaneously, knowledge produced in the process of abstracting and recomposing the built environment leads to an overarching definition of architecture and its telos. 30

Confident with our methodological choices, the need to quickly adapt to a new reality led us to reformulate the studio's main assignment – building in Romania was no longer possible. Moving towards full online teaching we invited students to focus their study on a single detail, using the project machine loop. From a comparative analysis of details from two national building cultures, we redirected our efforts towards a theory of architecture; obtained from buildings firsthand, and able to recognize that beyond national divisions, different cultures (e.g. managerial, artistic, political, etc.) compete and collaborate for the production of the built environment. 31

On these grounds, students were asked to select a detail, study it thoroughly following the steps described in the loop, recognize one or more épistémès as the source of instruments and methods required for their study, and eventually aim for a theory making sense of their findings.

One and many details

To capture the proliferation implied in Motta and Pizzigoni's project machine, and more specifically, to reveal the poly-technicity it presumes in every architecture, we took a

cue from Joseph Kosuth's "One and Three Chairs" – an artwork consisting of a physical chair, a poster with a textual definition of the word chair, and a printed photograph of a chair. [32] Kosuth's installation reveals the complexity of objects around us, as well their interrelatedness. Between three different embodiments of a chair lies their chair-ness, a theory of chair. In a similar vein, we strove to present multiple versions of the architectural detail, in order to capture its complexity and multiple interrelations. [33] Students were asked to select a point in a building where three or more materials meet. [34] This point should occupy a volume no larger than 45 cm3 (roughly 1.5 cubic feet). [35] There were no further restrictions or indications regarding the purpose, style, age or importance of the buildings where these details were to be found. Rather, students were encouraged to look for points where materials and building techniques clash and grapple with each other, on the basis of genuine curiosity. [36]

After a week-long survey the four groups of students presented some alternatives and, by consensus, the final four details were chosen. Using the project machine loop students analyzed each detail thoroughly, turning its presence into an absence, summarized into one or more concepts deemed essential to it. Towards the end of the quarter, those concepts were synthesized into a presence: the design of a new object that embodied the knowledge obtained from or developed through the exercise.

The first group of students selected a detail from a residential building in Van Bleyswijckstraat, Delft, where a glass window, an oil-painted wooden frame, prefabricated concrete claustra, a cast-in-place concrete slab, and a surface of conventional brick masonry meet. [37] (Fig. 2) The analysis of this detail revealed a number of marks left by multiple transformations of the building: an exterior stair had been removed, new materials and modern technical features were added, leaving traces and rough or incomplete unions between materials.

Figure 2: Chosen detail in Delft. Source: provided by students

These marks were assimilated to scars, defined as 'marks left on the skin or within body tissue where a wound, burn, or sore has not healed completely and fibrous connective tissue has developed.' [38] Further reflection on scars led to an important realization. In contrast to the rather negative terms in which scars are commonly perceived by Western societies, different cultures engage in the deliberate production of scars for aesthetic or socially communicative purposes – a process known as scarification. This discovery allowed students to reflect on the role and perception of scars-like anomalies in architecture, and to recognize that the architectural detail can operate as a conventional, accidentally produced scar, or as deliberate scarification, able to communicate a particular meaning. This possibility was further assimilated to the Japanese tradition of Kintsugi, and the concomitant Japanese philosophy of wabi-sabi, which recognizes beauty in the accidental, flawed and imperfect, as opposed to the rationalist, perfectionist or determinist approaches which are prevalent in modern Euro-American architecture culture.

Furthermore, the fibrous nature of scar tissue was utilized as a metaphor for the multilayered nature of architectural thinking and action, in which aesthetics, context, material and technique, but also reason, authority, emotion and sensory perception

collide. (Fig. 3) These principles were represented in a scale model of the detail, in which golden kintsugi-like filaments were utilized to highlight existing imperfections. (Fig. 4) As a final project, a performance was used to record the multiple transformations of built space that occur within the apparent banality of everyday life (a tabletop meal, in this case), as well as the traces or scars left by that action.
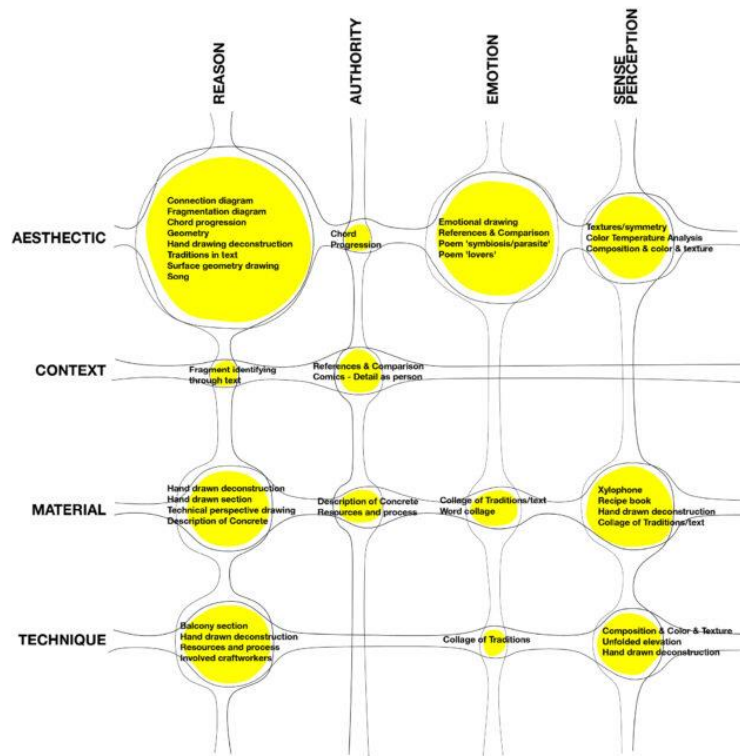

Figure 3

Fig. 4

A second group studied a detail from a backyard fence in Rotterdam, including barbed wire, a protective spiked steel blade, a metal tube, wooden boards, and a plastered wall. [39] (Fig. 5) Taking Semper's conflation of material and purpose, the group hypothesized the purpose of this architecture as that of emphasizing otherness – a rather violent form of otherness, actually. A proliferative, polytechnic dissection of the detail was accomplished by classifying some of its key features as constructed, and others as construed, based on Frascari's 'Tell-the-tale detail'.

After re-assembling the multiple representations of the constructed and the construed versions of their detail into a table, in which the notion of otherness was transformed from protective or defensive to a collaborative kind of otherness, the group searched parts of the city for more details with the same characteristics. (Fig 6) The results of this second round of analysis (the group's quest for more empirical evidence) were remarkable. Two versions of the same detail were found. One revealed the solution to the apparent need for a stark division between someone (the owners, those inside the house) and someone else (the other). Throughout the city – the students discovered – fences and hedges had been complemented with extensions, in the guise of barbed wires, extra boards, and other kinds of supplements. (Fig. 7) Interestingly, most of these

details were seen in buildings of a particular age; newer buildings lacked supplements because they have absorbed them. In other words, the group discovered that after a certain point in history, what was initially an addition – their detail – was incorporated into new architecture, as higher walls or thicker fences. (Fig. 8)

A third group investigated a detail from a shop window in the Hague's Wagenstraat (the heart of the local Chinatown) comprising a cloth awning or marquise, a glass pane, an electronic sign, a rope, and a wooden structure. 40 (Fig. 9) Archival research revealed changes in the building since 1904, revealing how certain elements were removed only to reappear later, while others remained untouched, despite changes in the use of the shop. 41
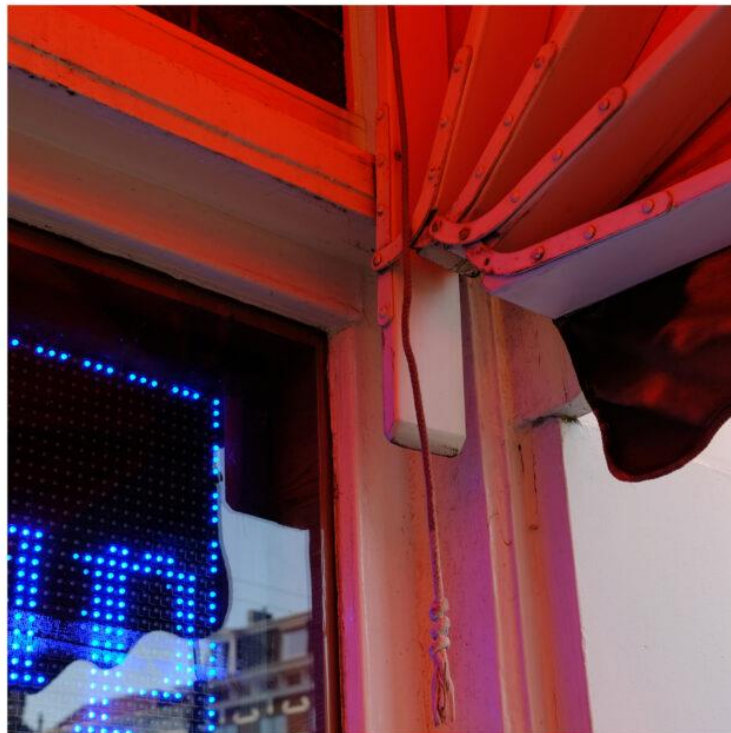

Figure 9

Based on its current state, the group studied the detail's different components in isolation, using a diversity of means to convey its polytechnic nature. (Fig. 10) Among these were scale plans and cross-sections, but also a descriptive text, which was deconstructed to reveal a multitude of meanings suggested by that detail's constituent parts, performance, transformation and so on. These meanings led to the recognition of the 'theatrical' nature of the detail, suggesting that architecture, even in its most minute

or apparently prosaic expressions, is the stage of negotiation between chaos and order, in which 'surprise and ambiguity should not be avoided.' [42]

Metal components of awning   Structural components of building   Window components   Digital screen components   Metal bone   Fabric cover

Rope   Wood component   Wood frame with white paint   Diode Pixels   Brick pillar with white   Metal frame covered

Metal hinge   Cement ornament panel   Signal layer glass   Plastic enclosure   Metal fixing
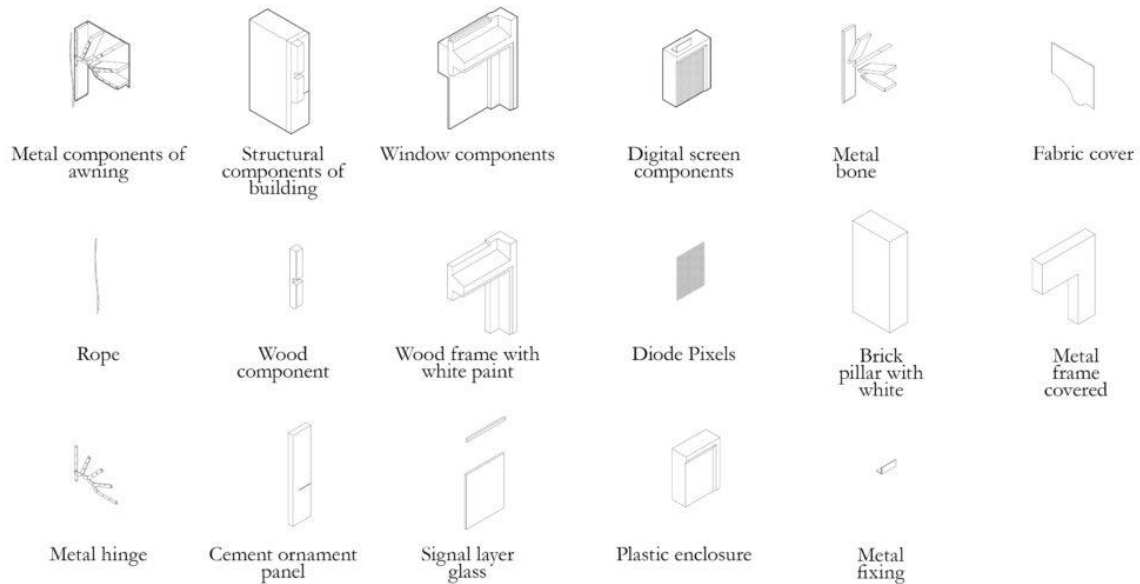
Figure 10

To embody this negotiation the group built a movable booth, rearranging the same elements and materials present in the detail (Fig. 11). The booth was placed in a number of public spaces in and around Delft, and produced different reactions from the public, ranging from indifference to surprise, and from interaction to avoidance. (Fig.12) Finally, and in tune with its dramatic origins, it was destroyed by a storm.
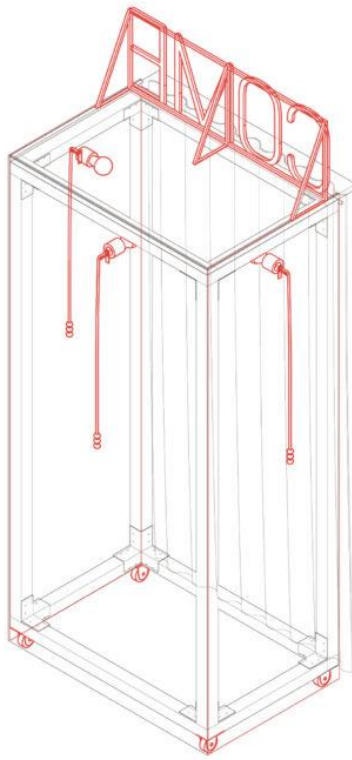
Figure 11:

Figure 12

The fourth group investigated a detail in the French town of Cailloux-sur-Fontaines, composed of a zinc roof sheet, stone masonry, a gutter, wire, and vegetable life. [43] (Fig. 13) What began as a technical analysis of the materials and processes implied in its construction (evaluating the built as a 'succession of movements, a choreography dictated by specific tools engaging the body' [44].) revealed the key role of improvisation and ad-hoc-ness in the production of the detail. (Fig. 14) This realization led the group to reflect on the way the professional community understands the role of the architect. In some cases, the group found out, architecture benefits from rationality and the ability to project possible futures with some degree of accuracy. Academically formed architects, at least in our tradition, operate on this paradigm. A large part of the built environment, however, does not correspond to this vision, nor is the outcome of its application. (Fig. 15) Both historically and globally, it is the result of impromptu actions, which strive primarily for the efficient use of available resources, rather than the quest for ideal results.

Represented in a graph, (Fig. 16) the group proposed a series of qualities that characterize spontaneous and professional ways of doing architecture, and suggested that academia would benefit from recognizing elements from ad-hoc practices as means

to improve the architect's education. This interrelation was developed in a project, in which conventional workspaces in four different countries were first subverted and then unified ad-hoc. The result was a virtual constellation of surfaces, collaged into a communal workspace.

Rare and precious artifices

Throughout the development of these studio projects, we certainly made room for the productive study of four built details, seen as rare and precious artifices of architecture. As sources of a particular kind of knowledge and questions that can only emerge from the built, these details offered us a number of particular and critical discoveries that can only be garnered from a close relation with buildings, and from the attempt to understand the reasons that justify their existence. Now we can confidently conclude that the act of building generates a singular form of architectural scholarship; one that we perceive as less naïve or arrogant, and more inclusive than that offered by traditional design studios. [45] In other words, our approach has allowed us to recognize how 'analysis brings to light a sort of monstrosity in (…) buildings. Their complexity, their innumerable facets, their ruptures and incongruities revealed in their analysis erode any certainty with which we could see them as firm and present objects.' [46]

Aged, weathered, even colonized by nature and yet able to perform the task they were built for, the four details taught us that even the simplest of architectures contains valuable lessons about ourselves and about the environments we build. In Ford's words 'the act of detailing is a question not just of part to whole, of construction to ornament, of style to reality, but of the relationship of ourselves to the work of architecture'. [47] This conclusion was further developed by the students into four theories of architecture.

A theory can be understood as the explanation of what architecture is, a definition of the principles on which its practice is based, and the justification of a course of action for its practice. Towards the end of the studio, students arrived at the conclusion that architecture is made of surfaces that constantly change and decay, but also scar and therefore heal, in a process that explains the resilience of the built environment. They also explained architecture as an interface of 'mediations between one and another' [48], able to define limits between individuals, but also to favor communication. A third explanation presented architecture as a mechanism, able to support and represent our actions, while a fourth saw architecture as a discipline split between two powerful forces: an artistic practice aimed at the production of meaningful objects, as well as the pragmatic attempt to make the best possible use of available resources.

Regarding the principles on which its practice is based, a group of students proposed that architecture consists of the flawed, imperfect, or incomplete, as much as it consists of control and the aim for perfection. Another group suggested the need to practice architecture on the basis of generosity, recognizing the other not as a threat, but as a potential interlocutor. A third group claimed that architecture should accept our earthly existence as plagued with uncertainty, and should be practiced as the honest recognition of that uncertainty. Finally, we were invited to trust that the practice of architecture depends on its ability to negotiate spontaneity, ingenuity and chance.

We can now contemplate four courses of action for the development of architecture, justified by these projects. On the one hand, we can assume that architecture should become rougher, less neat and sharp, 'embracing our limitations as architects'. [49] We can also trust that architecture will naturally progress, in a process that starts with ad-hoc solutions to pressing questions, and eventually absorbs those solutions within its evolved form. Furthermore, we can aim for an architecture that is theatrical, dramatic, poetic; and we might also assume that a desirable course of action for architecture demands a reconciliation of artistic and technical practice into a comprehensive discipline, able to make sense of the achievements of constructors, engineers and designers alike.

These theories are clear, reasonable and pertinent. They have also proven operative, having generated tangible developments – new presences as we have called them. Certainly, they resonate with existing theories: the political recognition of the other as both competitor and collaborator, or the valuation of improvisation, for example, can be found in studies of public space and in reflections on agency in architecture. Despite being familiar with some of those theories, students arrived at them on their own, via the age-old process of observing with attention, pondering on what has been observed, and discussing it with others.

Aiming for the degree of Masters of Science in Architecture, this group of students work towards the attainment of the skills required to practice their profession reliably. The mastery of those skills – the degree suggests – depends on their adoption of scientific attitude, marked by skepticism, openness to severe criticism, and the rigorous evaluation of empirical evidence. With this studio, we tried to foster that scientific attitude, inviting students to become independent thinkers, responsible for the theories of architecture that will support their professional actions. Independent thinking benefits from the ability to confront the built environment directly, in all its complexity and beauty. It is in this sense, we now believe, that pedagogy should consider the

contingencies of building: as indispensable and irreplaceable empirical evidence, on the basis of which the architect as an independent thinker can strive for the growth and development of knowledge.

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Captions:

- Figure 1: The presence-absence loop. Source: authors
- Figure 2: Chosen detail in Delft. Source: provided by students.
- Figure 3: Multilayered nature of architecture. Source: provided by students.
- Figure 4: Detail model, with intervention. Source: provided by students.
- Figure 5: Chosen detail in Rotterdam. Source: provided by students.
- Figure 6: Reconstruction of the detail. Source: provided by students.
- Figure 7: Examples of interventions in Rotterdam. Source: provided by students.
- Figure 8: Examples of absorption. Source: provided by students.Figure 9: Chosen detail in The Hague. Source: provided by students.

- Figure 10: Deconstruction of the detail. Source: provided by students.
- Figure 11: Design of the object. Source: provided by students.
- Figure 12: Photograph of the booth. Source: provided by students.
- Figure 13: Chosen detail in Cailloux-sur-Fontaine. Source: provided by students.
- Figure 14: Deconstruction of the detail. Source: provided by students.
- Figure 15: Construction performances. Source: provided by students.
- Figure 16: The impromptu/institutionalized architecture. Source: provided by students.

1. Anderson, Stanford. 'Introduction,' in Planning for Diversity and Choice: Possible Futures and Their Relation to the Man Controlled Environment, 5. Cambridge (Mass.): MIT, 1968

2. This argument is further developed in Mejía Hernández, Jorge. "Writing, Filming, Building: Using a Taxonomy of Moviegoers to Appraise Spatial Imagination in Architecture." Writingplace Journal # 4 (2020), in preparation

3. As an example of this, in our Faculty there are separate departments of Architecture and Architectural Engineering and Technology (AE&T). Mentor teams for each graduation project include tutors from each of these departments, but AE&T teachers offer separate tutorials, have a much smaller dedication than their colleagues from Architecture, arrive halfway through the year-long graduation process, and are requested to assign a separate grade for the Building Technology component of each project.

4. A similar assignment (albeit without the theoretical ambition) has been developed by Federico Soriano, from the ETSAM, in his Unusual Atlas of Construction Details, Unit 19 Assignment, 2013 – 2014, https://issuu.com/uddfedericosoriano/docs/e_02_details, accessed 22 July 2020

5. This understanding has been developed in Mejía Hernández, Jorge. Transactions; or Architecture as a System of Research Programs. PhD dissertation, Delft: TU Delft, 2018; and has been tested in the Lecture Series Research Methods, offered to all MSc3 students of the TU Delft Department of Architecture between 2015 and 2020.

6. Our research is conducted within the section Methods and Matter and the research groups Situated Architecture and Architecture Culture and Modernity; while the courses described here are offered by the chair of Methods of Analysis and Imagination (previously Methods and Analysis), all part of the Department of Architecture, Faculty of Architecture and the Built Environment at TU Delft.

7. Previous versions of this studio have encouraged students to confront the instruments and methods of architecture with those utilized by filmmakers, choreographers, anthropologists and literary writers, among others.

8. For a full description of our studios: https://www.tudelft.nl/onderwijs/opleidingen/masters/aubs/msc-architecture-urbanism-and-building-sciences/master-tracks/architecture/programme/studios/methods-and-analysis/ . Our adherence to a falsificationist demarcation of science implies a revision of the classic definition of an épistémè as true knowledge, opposed to doxa, or opinion. Rather than as truth, we prefer to assume an épistémè as an organized system of ideas for the production and development of knowledge.

9. For a description of these heuristics and their role: Mejía Hernández. Transactions, 80 – 96

10. Current favorites among students are the oneiric and colorful small-frame perspectives of Office KGDVS, the stern and empty interiors of DOGMA, or the playful and busy inhabited drawings of Atelier Bow Wow, for example.

11. The program is supported by a Marie Słodowska-Curie action. For more information: https://tacit-knowledge-architecture.com/ , accessed 22 July 2020.

12. "… there are objects that certainly belong to ceramics from the point of view of materials, inasmuch as they are formed from a soft mass that was hardened and fixed. But they should be seen as relating to ceramics only secondarily, because formally they are in a different sphere." Semper, Gottfried. Style in the Technical and Tectonic Arts; or, Practical Aesthetics. Trans. Harry Francis Mallgrave and Michael Robinson. Los Angeles: the Getty Research Institute, 2004, 110

13. This preliminary program was developed in agreement with the Ion Mincu University of Architecture and Urbanism, whose research is focused on the study and preservation of the material culture and crafts in Chiojdu, and with valuable support from the Order of Romanian Architects.

14. Semper. Style, 107

15. Cache, Bernard "Digital Semper." In Anymore, edited by Cynthia Davidson, 190 – 97. Cambridge, MA: MIT Press, 2000, 190 – 197

16. Frampton, Kenneth. Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture, edited by John Cava. Cambridge, MA, and London: MIT Press, 1995, 1 – 27, 299 – 387

17. Cadwell, Michael. Strange Details. Cambridge, MA, and London: MIT Press, 2007, xv – xxi, 2 – 46

18. "Scarpa seems to me to be not only intelligent and masterful in his architecture, but generous and gracious as well. For he cannot resist it: as we drift to the glass wall and discover that there are three exits (more than enough), Scarpa offers a final figure. The wall that appeared monolithic holds a little door. The door, its travertine grain swirling about and its sill slipping up the jambs, opens with a nudge to reveal a second little gallery. It is a gentle reminder to pay attention, especially to distractions." Ibid., 30

19. Frascari, Marco. "The Tell-the-Tale Detail." In Theorizing a New Agenda For Architecture: An Anthology of Architectural Theory, 1965 – 1995, edited by Kate Nesbitt. New York: Princeton Architectural Press, 1996, 500

20. Ford, Edward R. The Architectural Detail. New York: Princeton Architectural Press, 2011, 9 – 47, 286 – 313

21. Staničić supported his lecture with: Micieli-Voutsinas, Jacque. "An absent presence: Affective heritage at the National September 11th Memorial & Museum", Emotion, Space and Society 24 (2017) 93 – 104

22. Namely: Julie Mehretu, Sarah Sze, Olafur Eliasson, Pierre Huyghe, and the groups Assemble and Forensic Architecture

23. The investigation leading to this publication, the authors note, started in Milan (strongly influenced by Grassi's and Rossi's neo-rationalist theory, but also by the latter's Scientific Autobiography), and was later continued in Turin, where they both taught and researched. Among the ambitions of their methodology (aside from 'achieving … a generalized high quality of architectural projects') is to reconcile a series of age-old dilemmas of architecture, e.g. autonomy vs. heteronomy, or adherence to type vs. creative freedom. Motta, Giancarlo, and Antonia Pizzigoni. La Máquina de Proyecto. Edited by Rodrigo Cortés and Nancy Rozo. Bogotá: Universidad Nacional de Colombia, 2008, 13 – 15. All translations from this book are by the authors.

24. Ibid., 15

25. Ibid., 21 – 32

26. 'Given the fact that it opens and closes with a text, the grid institutes more a circularity than a lineal trajectory with a beginning and an end'. Ibid., p. 58

27. A full explanation of the relation between analysis and project is offered in Ibid, 176 – 180 (diagram, 178). Not mentioned by the authors, there seem to be important links between this loop and John Dewey's theories of knowledge in practice (esp. his so-called 'developmental spiral'), as well as with C.S. Peirce's logical inferences (excl. abduction).

28. Justifying our choice for this particular methodology, its polytechnic understanding of architecture links the 'project machine' to traditions that recognize proliferation as a fundamental source of scientific knowledge, e.g. Feyerabend, Paul K. "Outline of a Pluralistic Theory of Knowledge and Action." In Planning for Diversity and Choice: Possible Futures and their Relation to the Man Controlled Environment, edited by Stanford Anderson, 275 – 84. Cambridge, MA: MIT, 1968.

29. Motta and Pizzigoni ratify this interpretation, and refer to these systems of ideas as discourses. In their analysis of Milanese houses, for instance, they note the huge differences in outcome that come from analyzing the same house from normative (i.e., urban legislation), functionalist,

hygienic-sanitary or aesthetic-communicative perspectives. Motta and Pizzigoni, La Máquina de Proyecto, 164

30. Wartofsky, Marx W. 'Telos and Technique: Models as Modes of Action' in Models: Representation and the Scientific Understanding. 140 – 153. Dordrecht, Boston, and London: D. Reidel Publishing Company, 1979

31. The multiple transactions that are carried out between these different cultures ratifies what we've mentioned in notes 26 and 27 above. For the recognition of differences beyond national cultures in the production of the built environment, Zimmermann, Bénédicte. 'Histoire-Croisée' Footprint 26: The Architecture Competition as a Contact Zone (v. 14, n. 1, spring/summer 2020) 7 – 14

32. Kosuth, Joseph. One and Three Chairs. 1965, installation. Museum of Modern Art, New York.https://www.moma.org/learn/moma_learning/joseph-kosuth-one-and-three-chairs-1965/, accessed 22 July 2020.

33. Similarly, Frampton notes how technē denotes 'the simultaneous existence of both art and craft, the Greeks failing to distinguish between the two. It also implies knowledge, in the sense of revealing what is latent within a work; that is to say it implies aletheia, or knowing in the sense of an ontological revealing. This revelatory concept returns us to Vico's verum, ipsum, factum, to that state of affairs in which knowing and making are inextricably linked; to a condition in which techne reveals the ontological status of a thing through the disclosure of its epistemic value. In this sense one may claim that knowledge and hence beauty are dependent upon the emergence of "thingness".' Frampton. Studies in Tectonic Culture, 22.

34. Mejia Hernandez, Jorge, 'The Way Things Touch' http://writingplace.org/?p=332, accessed 22 July 2020

35. It must be noted that above we mention 45cm2. At an early stage in the exercise we realized the need for a three-dimensional appraisal of the detail, and even contemplated adding a fourth dimension (45 seconds). This last possibility was eventually discarded.

36. Pratt, Mary Louise: "Arts of the Contact Zone," Profession (1991), pp. 33 – 40

37. Group 1 was formed by Tslil Srauss, Wesley Lijkendijk, Boyang Tan, and Suihao Zhen

38. Excerpt from Group 1's, final report.

39. Group 2 was formed by Theo Brakeman, Rik de Brouwer, Rasmus van Overhagen, and Dirk Hoogeveen

40. Group 3 was formed by Federico Ruiz Carvajal, Linda Kronmuller, Xiaoyue Shi, and Jasper van der Vaart

41. According to Group 3's findings, the shop has been used in the following ways: 1904 – ca. 1960, grocery store, ca. 1960 – 1970, retail, 1970 – 2010, lighting business, 2010 – 2016, beauty salon, 2016 – present, acupuncture clinic.

42. Excerpt from Group 3's final presentation: https://www.youtube.com/watch?v=5uTfZLhdfTo, accessed 22 July 2020

43. Group 4 was formed by Hannah Wehrle, Benoit Marcou, Basak Gunalp, and Saskia Tideman

44. Excerpt from Group 4's final presentation

45. 'Multiplicity, or better, the dispersion of meanings and the impossibility of reaching an ultimate and definitive meaning is what emerges as the effect of that particular play of references which constitutes analysis.' Motta and Pizzigoni. La Máquina de Proyecto, 170

46. Motta and Pizzigoni. La Máquina de Proyecto, 168

47. Ford. The Architectural Detail, 306

48. from Group 2's final presentation

49. From Group 1's final report.