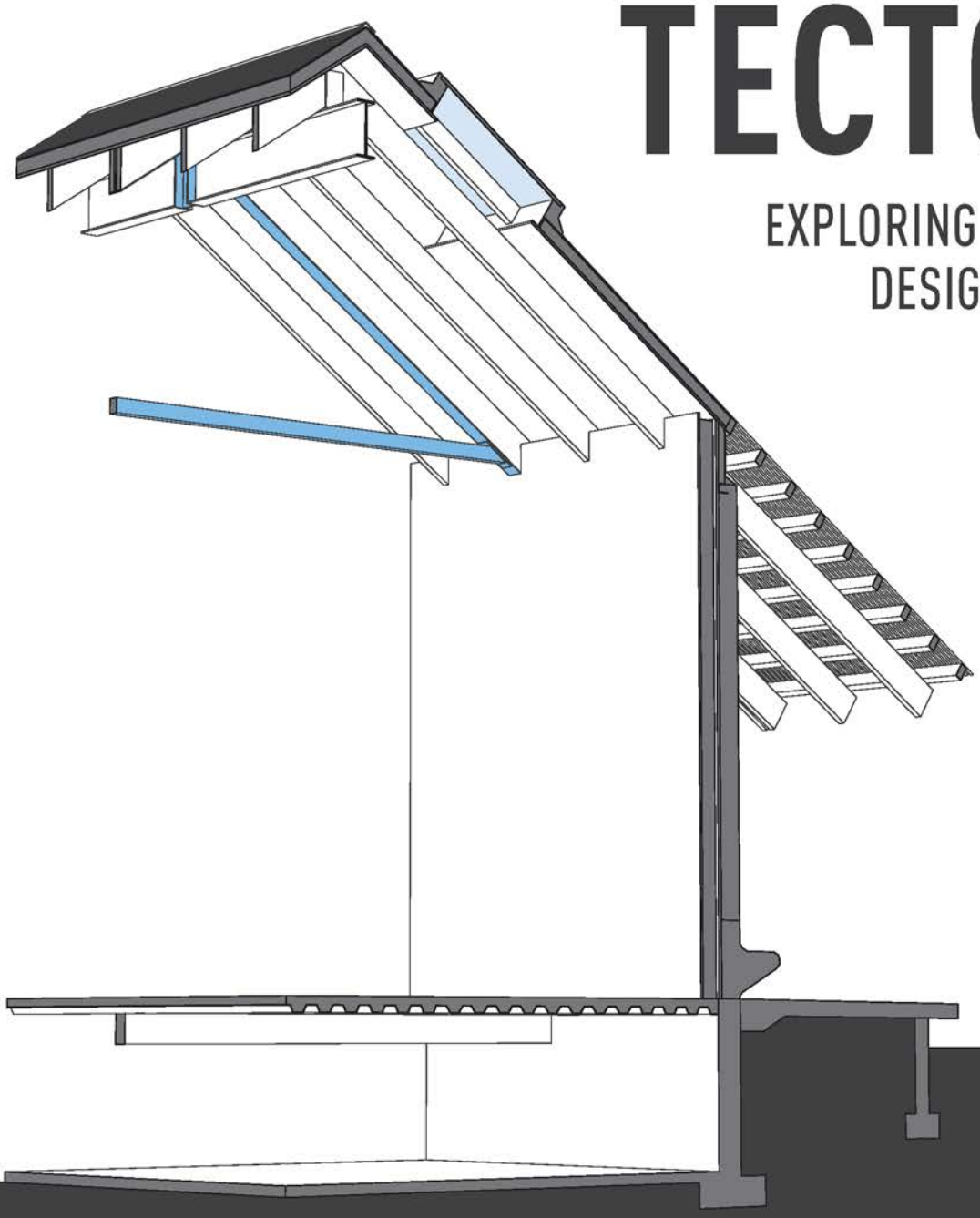
CHAD SCHWARTZ

INTRODUCING ARCHITECTURAL TECTONICS

EXPLORING THE INTERSECTION OF DESIGN AND CONSTRUCTION

FOREWORD BY EDWARD R. FORD



ROUTLEDGE

INTRODUCING ARCHITECTURAL TECTONICS

Introducing Architectural Tectonics is an exploration of the poetics of construction. Tectonic theory is an integrative philosophy examining the relationships formed between design, construction, and space while creating or experiencing a work of architecture. In this text, author Chad Schwartz presents an introductory investigation into tectonic theory, subdividing it into distinct concepts in order to make it accessible to beginning and advanced students alike.

The book centers on the tectonic analysis of 20 contemporary works of architecture, located in 11 countries, including Germany, Italy, the United States, Chile, Japan, Bangladesh, Spain, and Australia, and designed by such notable architects as Tadao Ando, Herzog & de Meuron, Kengo Kuma, Olson Kundig, and Peter Zumthor. Although similarities do exist between the projects, their distinctly different characteristics – location and climate, context, size, program, construction methods – and range of interpretations of tectonic expression provide the most significant lessons of the book, helping you to understand tectonic theory. Written in clear, accessible language, these investigations examine the poetic creation of architecture, showing you lessons and concepts that you can integrate into your own work, whether studying in a university classroom or practicing in a professional office.

Chad Schwartz is an architect and educator currently serving as Assistant Professor in the School of Architecture at Southern Illinois University, USA. He teaches both design and building technology, continually seeking to merge the two bodies of knowledge. His research focuses on the introduction of critical making, tectonic investigation, and design/build into the classroom.

"Schwartz's clear content outlines logic that designers can use for creating structures and choosing materials for their integrated designs. This logic makes these case studies relevant learning tools, particularly for younger design students."

Charlton N. Lewis, University of Texas at Austin, USA

"This book fills the void between treating the concept of detailing and tectonics in a theoretical way, and focusing on construction practicalities. I particularly like the grouping of architectural building types, and the projects are very appealing. The quality of the graphics is excellent and there are drawings at a variety of scales, explaining the details well and situating them within the overall building and site context."

Greg Johnson, University of British Columbia, Canada

"This book provides a much-needed introduction to the themes of place and tectonics in architecture. The theoretical material forms the basis for in-class discussions, and the case study projects exemplify analytic methods that students can apply to additional cases as well as their own design projects."

Michael McGlynn, Kansas State University, USA

"Schwartz appraises buildings critically with complete descriptions, useful photographs and drawings, balanced opinions, and no jargon. The book is both concise and a clearly written text on architectural theory, which is rare. This will help architecture students and designers move on from the superficiality of current fashion."

Angus Macdonald, University of Edinburgh, UK

INTRODUCING ARCHITECTURAL TECTONICS

Exploring the Intersection of Design and Construction

Chad Schwartz

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I dedicate this book to my parents, Roger and Judy Schwartz, for 38 years of unconditional love and support.

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Peninsula House from the southeast, Sean Godsell Architects, Melbourne, Australia, 2002

[T]he primary principle of architectural autonomy resides in the *tectonic* rather than the *scenographic*: that is to say, this autonomy is embodied in the revealed ligaments of the construction and in the way in which the syntactical form of the structure explicitly resists the action of gravity.

Kenneth Frampton, “Towards a Critical Regionalism,” 1998

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Foreword

Edward R. Ford

In 1969, in his conclusion to *The Architecture of the Well-Tempered Environment*, a history of the effect of environmental controls, or perhaps the lack thereof, on modern architecture, Reynar Banham wrote:

> The . . . history . . . in the previous chapters can be summed up in two ways: either as the final liberation of architecture from the ballast of structure, or its total subservience to the goals of mechanical service.
>
> [. . .]
>
> [W]e have to face the fact that the architect as we know him at present, the purveyor of primarily structural solutions, is only one of a number of competing environmentalists, and that what he has to offer no longer carries the authority of . . . necessity.[1]

Three years later in 1972, Robert Venturi, Denise Scott Brown, and Steve Izenour, in *Learning from Las Vegas*, turned the last screw in the coffin lid of constructive rationalism, at least in their own minds. They wrote: "The relevant revolution today is the . . . electronic one. Architecturally, the symbol systems that electronics purveys so well are more important than its engineering content."[2] This was also the year Intel introduced the 8080 chip, making practical the first personal computers and sparking the digital revolution that followed.

In retrospect, this moment marked a major shift in the direction of modern architectural theory. Structural rationalism seemed to disappear altogether. The notion that the modern style was based on a kind of constructive inevitability was replaced by the sense that it was just another style. Formalism, the idea that we understand a building through the relationship of its parts – whether the form is closed or open, whether the elements are multiple or singular – gave way to semiology and all that followed, the idea that we understand art by symbolic association, that we *read* buildings as a text rather than understanding them as assemblies in equilibrium. The decline of the idea of a structural understanding of architecture took with it, understandably, Heinrich Wölfflin's idea of empathy, that we relate to a work of architecture by understanding the forces and weight within a building in the same way we understand of the forces and weight in our own bodies.

Much of contemporary theory assumes that the fundamental basis of architectural history has changed, that the contemporary condition, especially the digital revolution, has altered

not just the future but also the past, and that if history is relevant today, and to some it is not, it must be rewritten to remain so. Many of modernism's fundamental understandings of architecture – the relation of form to structure, of construction to design, and the idea that the building's interior, both constructively and spatially, has a role in determining its envelope – are gone.

Most of this thinking is absent from this text. While others see a radical theoretical break in the architectural history of the last 200 years, Chad Schwartz sees a great deal of continuity. It is a premise of the book that nineteenth-century theory, or at least the best parts of it, is key to understanding twenty-first-century practice. Not just nineteenth-century theory, but Germanic tectonic theory in particular – the constructive symbolism of Karl Bötticher, the empathetic formalism of Heinrich Wölfflin, the structural rationalism of Arthur Schopenhauer, and most importantly for Schwartz, Gottfried Semper's concepts of the four primary architectural elements (hearth, roof, wall and mound), his historical model of frame and cladding and the resulting languages that grew out of them.

Semper is rarely mentioned in early modernist texts, but Schwartz is not alone in this interest. Joseph Rykwert began Semper's resurrection in his article of 1973, followed by Wolfgang Herman's monograph of 1984 and Harry Malgrave's of 1996. Malgrave's translation of *Der Stil* in 2004, 142 years after its publication, finally made it available in English. Schwartz's principle ally here is, of course, Kenneth Frampton. In 1995, on the eve of the digital revolution, Frampton, in his *Studies in Tectonic Culture*, applied Semper's mode of formal characterization to a variety of modern buildings. While there is evidence that architects like John Root, Frank Lloyd Wright and Bernard Maybeck were well aware of Semper, Frampton sees Semper's relevance extending well beyond to Carlo Scarpa and Peter Smithson. At one point, Frampton implies that Semper's four elements are "cosmogonically encoded,"[3] suggesting they evoke some conscious or unconscious archetype that transcends direct influence; but more commonly the architects discussed were, in Frampton's view, if not aware of an influence, a part of the tradition it created. Thus H. P. Berlage is strongly influenced by Semper, while Herman Hertzberger, even if unaware of Semper, is a part of the tradition that Berlage created along with Jan Duiker and others.[4] But whether encoded or acquired, these readings remain valid to Frampton, regardless of the technological upheaval of the twentieth century.

Is this true? There are some large problems. The fundamental assumptions of all of these writers were based on the analysis of stone, load-bearing masonry buildings with few if any environmental controls, in most cases the classical orders of Greece; and continued belief in these principles requires the assumption that they do not change with technology, however radical the change may be. Setting aside the magnitude of recent technological change, equally problematic is the fact that, with few exceptions, most eighteenth- and nineteenth-century theorists – Marc-Antoine Laugier, E. E. Viollet-le-Duc, and Semper – found it necessary to fabricate their own creation myths of the origins of architecture, which to most of them meant the Greek orders. It is remarkable, even allowing for the fact that anthropology was in its nascence, just how inaccurate these mythologies were. The *primitive* men they envisioned, who built these *primitive* huts, were seen by these writers as rational and empirical, blessed with the condition of starting from scratch and unencumbered by

precedent. While generalizations of any kind are dangerous in anthropology, we know that there was little creativity in Neolithic societies, including archaic Greece in which tradition was paramount and in which the distinction between science and magic, so essential to us, was unknown. Semper's version may be more plausible, but not necessarily more accurate.

But despite all this, I am in substantial agreement with the author. I wrote in 1990 that the bulk of our contemporary ideas about good building came not from an analysis of the conditions of modern construction but from nineteenth-century theories; and despite the rhetoric to the contrary of the last 25 years, to me it remains true. I would argue for a slightly different genealogy for these ideas. Certainly the French, not to mention the Dutch and English, deserve equal time with the Germans. For example, Thomas Carlyle's *Sartor Resartus* (*The Tailor Retailored*) was probably far more important to Wright's ideas about clothing/cladding and their relation to the body/structure than Semper's *Der Stil*. But in principle Schwartz has it right; despite our efforts to displace them, the work of Schopenhauer, Bötticher, Wölfflin, and Semper remain correct in their general, if not specific, conclusions, regardless of the inaccuracy of much of the historical analysis used to support them. Their conclusions as to how we best understand a building are based on perceptual phenomenon that while affected by technological change, are not eliminated by it and which remain the basis for the deepest of our architectural understandings.

Recent years have seen changes for the better in some quarters. Wölfflin's formalism is enjoying something of a comeback, particularly in the work of Nick Zangwill. Notions of empathy that have long been neglected in favor of *reading* are being actively re-examined by writers such as David Summers. Even Mark Wilson Jones, who has done as much as any to dismantle the notions of the constructive origins of the orders, finds some virtue in these writers – Semper in particular. Despite the technological transformations of the last 50 years and the innumerable errors of both fact and opinion to be found in the constructive theoreticians of the early modern era, the fact remains we have yet to produce better theory to replace them. It seems abundantly clear that weight and empathy are the basis for our abstract, as opposed to our symbolic, understanding of architecture; and Semper's notion of layered building, while never meant to be a formula for constructive practice, still has a meaningful connection with modern perceptions of building. That clothes are to the body as architectural cladding is to the structural frame is a thought one can find as readily in Herzog & de Meuron as in Otto Wagner.

Notes

1 Reynar Banham, *The Architecture of the Well-Tempered Environment* (Chicago: University of Chicago Press, 1969), 265; 267–8.

2 Robert Venturi, Denise Scott Brown, and Steve Izenour, *Learning from Las Vegas* (Cambridge: MIT Press, 1972), 151.

3 Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture* (Cambridge: MIT Press, 2001), 13.

4 Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*.

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Preface
Building a Foundation

In the opening lines of "The Tell-the-Tale Detail," the late architect and educator Marco Frascari wrote:

> Elusive in a traditional dimensional definition, the architectural detail can be defined as the union of construction, the result of the *logos of techn*é, with construing, the result of the *techné of logos*.[1]

In the Greek language, *logos* means discourse or the communication of thought through conversation while *techné* refers to the practice of making an object using previously gained knowledge.[2] Frascari's *logos of techné*, therefore, can be translated as a conversation about making and constructing. Its counterpart, the *techné of logos*, reads as the making of conversation or a discussion leading to the understanding of meaning.

This quotation – as well as the rest of Frascari's essay – serves as a catalyst for the study of the architectural detail, of the making of things, and of the theoretical premise of the tectonic. Frascari asserted that the joining of elements is not simply an act of construction, but a process that helps to define the space created *through* construction. This dialogue is essential for the development of a comprehensive architectural curriculum and has the potential to help fill some of the voids found in many current curricular models. For instance:

- Despite the efforts of many to minimize the separation of design, construction, and theory in schools of architecture, the divide still exists. Moments of intersection are too infrequent to properly prepare young minds for the complexity of architectural practice. Given the multifaceted structure of higher education (regulated course loads, core requirements, accreditation guidelines, etc.), full integration is impossible in most situations, but opportunities do exist for meaningful conversation between these knowledge bases.
- Novice students, more often than not, struggle with architectural theory. In many cases, the formal grammar, discipline-specific terminology, and surplus of unknown references lead to confusion and reluctance to independently pursue advanced lines of thinking. Avoiding theory altogether during these early years can lead to equally dismal

results. In order to prevent such outcomes, improved instructional tools need to be developed to assist in using theory as a productive part of a student's development.

- The study of precedents is crucial for the development of young architects. Exposure to a variety of ways of thinking about the built environment leads to a greater knowledge base from which to draw while working. These studies, however, need to be carefully calibrated as they often result in merely superficial engagement. Instead of alluring imagery, students must excavate critical lessons from these case studies; images alone explain very little of what a precedent has to offer. Instead, studies should focus on analyzing HOW the project works, responds, or engages.
- Many architecture students, especially those in their first years of study, lack the understanding that each line he or she draws is a representation of something real. Drawing lines and assembling space are significantly different undertakings, but they are intricately linked. Studying the translation of architectural representations to the reality of the built environment leads to better development of the critical thinking skills necessary to practice architecture professionally.

This book is a direct response to these realizations. It endeavors to deliver to you an understanding of the integrative potential of architectural tectonics. Just as Frascari did in "The Tell-the-Tale Detail," this text presents a conversation about the making of architecture that will hopefully resonate with you as you begin (or continue) your investigation of the built environment.

Notes

1 Marco Frascari, "The Tell-the-Tale Detail," in *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965–1995*, ed. Kate Nesbitt (New York: Princeton Architectural Press, 1996), 500. (Originally published in *VIA 7: The Building of Architecture*, 1984, 23–37.)

2 Adrian Snodgrass, "On 'Theorising Architectural Education'," *Architectural Theory Review* 5, no. 2 (2000), 89.

0.2
GC Prostho Museum Research Center, main gallery, Kengo Kuma & Associates, Kasugai, Aichi, Japan, 2010

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Acknowledgments

I want to first thank Max Underwood and Leslie Van Duzer for their ongoing mentorship, guidance, and inspiration in all matters, including the genesis of this book. Their advice and support gave me the confidence to take on this immense project. I also want to thank two architects – Michael Underhill and Mark Ryan – whom I studied under while working in their respective offices. The education they provided me as a novice architect pushed me to study the details of our practice and to embrace the relationship developed between design and construction. The line of inquiry presented in this book would not be possible without their tutelage. In addition, many of the faculty in the School of Architecture at Southern Illinois University (SIU) have been incredibly supportive of my efforts in writing this book. In particular, Walter Wender, Craig Anz, and Laura Morthland – along with Leslie Van Duzer – donated their valuable time to read portions of the book and provided feedback that helped refine the work of this first-time author. I also want to give a special thanks to Stewart Wessel. His almost daily inquiries about how the book was coming along, what chapter I was working on, or if I had met my deadlines always reinvigorated my dedication to continue writing. I cannot thank him enough for the motivation his continued interest in my work provided.

The initial explorations for the investigations in the book were undertaken in my third-year architectural studios. I want to thank the students in my sections of ARC351 during the fall semesters of 2013 and 2014 for being guinea pigs and starting the process of tectonically analyzing architectural works. In particular, I want to acknowledge Lauren Ovca. Two of her diagrams of Rafael Moneo's National Museum of Roman Art were reconceived and included in this book. In addition to these groups of students, I need to thank the team of intelligent and motivated undergraduate and graduate students from the School of Architecture at SIU who worked with me directly on the project. Without their help, I never could have completed the work that needed to be done within the available time frame. Anthony Michael spent his time primarily in the library assisting with the research for the book and helped to develop the initial proposal submitted for review. Nicholas Ouellette, Aaron Neal, and Robert Konzelmann spent countless hours creating, refining, and editing many of the drawings and diagrams found throughout the project chapters. Zoey Koester took on the challenging roles of assisting with the editing of the text and with the creation of abstracts and other written work. And, finally, Suzanne Abell and Aaron Neal, two of the brightest students I have ever had the privilege of teaching, spent an academic year coauthoring four of the project chapters in the book. Suzanne helped to pen the chapters on Olson Kundig's Brain Studio and Lake|Flato's Government Canyon Visitor Center while Aaron cowrote the chapters on Kengo Kuma's GC Prostho Museum Research Center and KieranTimberlake's Loblolly House. These two students responded to my challenge to extend the reach of their education, and their commitment and dedication to this process was greatly appreciated.

I must thank SIU, the College of Applied Sciences and Arts (CASA), and the School of Architecture for believing in me and this project enough to provide resources to support my research assistants. Funding was also provided by CASA and the School of Architecture to

cover the costs of obtaining copyright permission to use many of the photographs found in the book. I offer a special thanks to Nadine Wojnarowski for all of her efforts in processing the enormous pile of paperwork required to utilize much of this funding.

I also received a great deal of assistance from outside the university. I need to thank the architects, firms, librarians, photographers, marketing directors, and archivists who contributed their resources, time, and effort to assist me in accumulating the information required to complete this project. I must thank Edward Ford for graciously agreeing to write the Foreword for the book. His research into architectural detail was one of the catalysts that inspired my venture into this realm of architectural investigation. I am honored for him to have been a part of this process and for his contribution to the book. I am also grateful for his patience and guidance in our collaboration.

I need to thank the staff at Routledge – Wendy Fuller, Grace Harrison, Alanna Donaldson – and the rest of the publishing team for their dedication to helping me realize this project and for educating a novice author about the process of publishing a book.

And finally, I want to thank my wife Katherine and my three beautiful daughters: Charlotte, Amelia, and Addison (who joined our family during the process of writing the book). Their love, patience, and support made this book not only possible, but also worthwhile.

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GUIDING PRINCIPLES

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Introduction
Developing a Framework

Whether sitting in a classroom, at the office, in a library, or in your living room, if you have picked up this book then you are likely a student of architecture. This book is written for you. The intent is to deliver to you a clear and concise introduction to the central ideas of architectural tectonics; an introduction that is accessible to even the newest students of architecture, while sophisticated enough to satisfy the intellectual appetites of more advanced readers. This study begins, as the title states, with the intersection of design and construction. Each of these terms carries distinct meaning and ultimately defines the framework for this exploration of tectonics.

What is Design?

> Design in architectural practice is a process of connecting all the parts and details that are included in the concepts of durability, utility, and beauty into a convincing, buildable entity.[1]
>
> Jadwiga Krupinska, *What an Architecture Student Should Know*, 2014

Although also used to refer to the resulting product, *design*, in this context, refers to the active process of conceiving, developing, and representing the future of the built environment. This definition centers on the journey – the working through of a given problem. This process is driven by intuition and rigorous analysis, by creativity and critical thinking; it can be intimate for the designer, yet it can also be shaped by a substantial set of contextual influences, often requiring the integration of many points of view and multiple perspectives to ultimately achieve success. Design also exists at all scales, from the largest city plan to the most discrete building detail. We must, as Eliel Saarinen has stated, "Always design a thing by considering it in its next larger context – a chair in a room, a room in a house, a house in an environment, an environment in a city plan."[2]

Architectural design is often thought of as the creation of the aesthetic image of a building, but that is a rather limited understanding of the term. Design is not just concerned with appearances, but also with the development of the relationships between systems, components, ideas, and contextual influences. Architecture, after all, is systemic;[3] it is the weaving of physical (structure, plumbing, construction), nonphysical (circulation, light, security), and

even metaphysical (time, weight, embodiment) systems into spatial constructs. In *Designing Architecture*, Pressman says:

> Design is not something that is tacked on after analysis, or after solving the space-planning puzzle; nor is it purely aesthetic. The unsung element is the set of intangibles or cognitive processes that arise from a passionate and deeply personal involvement – with a project at every step of its development – from engaging clients to examining materials, components, and systems, to construction.[4]

Although *design* can refer simply to the cognitive act of conceiving ideas, with respect to architecture we must look beyond conception to the process of making representations. Design itself is not tangible, but the ideas generated through the design process have the potential to become real through translation into the sketches, drawings, models, renderings, and specifications that represent them. These representations are the architect's plan for action, the products of the design process that serve as a blueprint for construction.

What is Construction?

As with design, *construction* is not viewed in this text as just a product, but also as a process of making. The act of constructing is an embodied practice. Juhani Pallasmaa states:

> The authenticity of architectural experience is grounded in the tectonic language of building and the comprehensibility of the act of construction to the senses. We behold, touch, listen and measure the world with our entire bodily existence, and the experiential world becomes organised and articulated around the center of the body.[5]

Construction unites the body with the material world in a physical act of joining elements together to create a whole. This process also involves translating the architect's graphic and written set of instructions; it is the *enactment* of the plan for action.

Although the current "maker" revolution is slowly bringing design and construction closer together, most architectural works are built with precious little hands-on influence from those who designed it. Stephen Kieran and James Timberlake believe that:

> The design of how we go about designing, and ultimately making, circumscribes what we make. It controls the art found in its quality, scope, or features and also the resources of time and money expended on its production. This reality is completely contrary to the artistic and contractual structure of much current architecture, which specifically excludes the architect from participation in the "means and methods" of making, thus turning architects into mere stylists.[6]

In past eras, architects frequently apprenticed at a construction site as part of their education. This practice is scarcely utilized today. With a few notable exceptions, most architects are educated in the university and in the office. Despite a recent surge of design/build programs in schools of architecture,[7] rarely are contemporary architects trained through the

extensive making of "real" things. These individuals, however, must intuitively understand the construction processes at work to be able to embed appropriate instructions within their representations. Juhani Pallasmaa refers to this as instructing the "surrogate hands" that execute the work[8] – a difficult proposition for those who have never built anything themselves.

What Exists at the Intersection of Design and Construction?

Architecture is often described as the intersection, or perhaps *collision*, of art and science. These two distinct realms, however, cannot be set in opposition; they must be cooperatively utilized in the creation of the built environment. Architecture is an integrative art, one that combines the design of productive space with the tangible realities of gravity, material properties, and assembly sequences, amongst others. In order for architecture to succeed, it must be thought of as a whole. The study of tectonics can help to accomplish this goal. Tehrani states:

> [O]ne might argue that a building is intensified through the elaboration of its own medium – *a language of sticks and stones* – to induce a state of architecture. The "material" that underlies architecture is somehow rooted in construction and its details, and yet beguilingly, the devices that engage the building practice are most often in tension with the seemingly direct necessities of fabrication. Herein lies one of the most fertile and debated topics in architectural theory: the subject of tectonics. At the heart of this debate is the dilemma posed by the necessities of fabrication, which rarely coincide with the intended expression of a building, even in those projects whose authors profess an ethic of truthfulness or honesty to the facts of material construction.[9]

Tectonics has many definitions, but they all tend to focus on the relationships between those architectural elements we tend to hold apart: space and construction, structure and ornamentation, atmosphere and function. Architectural tectonics seeks a relationship between the design of space and the reality of the construction that is necessary for it to exist. The discussion of this relationship permeates this text.

How is this Book Designed and Constructed?

The main content of this book is delivered in two parts: an introductory essay on tectonics and a series of precedent analyses. The introductory essay is the foundation of the book and provides a fundamental grounding in the theory of tectonics. It contains three types of critical information. First, the essay introduces key individuals responsible for creating and advancing a theory of architectural tectonics. Second, it introduces terminology that is built upon later in the book. And finally, the essay establishes a framework of core concepts that are subsequently used to analyze the precedents. These concepts are presented in topical sections, each drawing from different lines of historical and contemporary thought:

- Anatomy: the study of the primary components and systems of a building inspired by Gottfried Semper's proposal for four elements of architecture.

- Construction: the study of the means and methods of construction as well as the materiality of the built environment. This topic contains two important subdivisions: Tectonic (the study of the lightweight assembled components of architecture) and Stereotomic (the study of the heavy mass components of architecture).
- Detail: the study of the joints and other critical conditions that make up the smallest scale of the built environment. This topic includes an important subdivision called Intersection, which is focused on the juncture between primary building components or systems.
- Place: the study of the impact of a specific place or context on the tectonic makeup of a building.
- Precedent: the study of past built work for the purpose of inspiring projects yet to come. The focus here will, of course, center on the adaptation of tectonic strategies from one project to another.
- Representation + Ornamentation: the study of the relationship between the actual construction of the building that is required for stability or enclosure and the cladding or ornamentation that is used to create the aesthetic scheme.
- Space: the study of the relationship between the creation of space and the construction and representational qualities of a building.
- Atectonic: the study of conditions that run contrary to typical tectonic ideas.[10]

At the heart of this book are 20 chapters that each present a precedent analysis of a masterfully built work of architecture. Studying the work of others through a process of careful analysis is a potent way of learning how to do things yourself. The process is reflective of an apprentice model: learning through the close examination of someone else's methods of practice, as from the hands of a master.

Simon Unwin acknowledges, however, that architecture students can be reluctant to engage with precedent studies because they "believe that their own originality and greatness will prosper best by insulating their creative genius from 'corruption' by the ideas and accomplishments of others," but "[b]oth evolutionary development and contradictory revolution depend on understanding what has gone before."[11] Precedents provide key lessons that can be drawn from, expanded upon, and utilized as a foundation for design work. Drawing from the analysis of a work of architecture is merely copying only when what is taken is superficial. If instead its critical lessons – relationship of components, systems of order, means of connection, conceptual partis, to name just a few – are examined and used as building blocks to help create new architecture then the precedent becomes a spark of inspiration.[12]

This book provides a platform for engaging with high-quality samples of the built environment that can provide this spark. The projects selected for study have distinctly different characteristics: location and climate, context (urban, suburban, and rural), size (under 40 square meters to over 4,600 square meters [400 square feet to 50,000 square feet]), program, and construction. Similarities do exist between the projects and, in some cases, these are specifically identified in the text to allow for cross-comparison. However, the strength of the lessons stems from the range of interpretations of the tectonic expressed in this set of projects.

Each project chapter is presented in a similar format, utilizing a combination of written explanations, diagrams, images, and drawings to deliver its lessons. The first component of each chapter is the base information – square footage, location, and program. Included in this information are the global positioning coordinates for each project (except single-family residences), allowing you to locate the works on a map or even in person. A brief introduction to the architect (or firm) responsible for the design of the building follows the base information along with an introduction to the project itself.

The body of each chapter centers on the analysis of the precedent through the topics outlined in the introductory essay. Although the topics remain the same from chapter to chapter, their order, inclusion, and relative significance varies based on the lessons offered by each project. To offer as many outlets as possible for continuing the exploration of ideas, each chapter concludes with two lists of sources: a selection of additional references and a selection of additional projects by the architect or firm.

This book is not intended to be a complete anthology of tectonic thought. *Introducing Architectural Tectonics* is, as the title states, an introduction; it provides a significant starting point and robust foundation for what could be a meaningful and informative study of architecture's essential elements. I hope that by reading through these pages, your interest in architecture and tectonics is piqued and that this book can serve as a catalyst for a lifetime of investigation into the design and construction of our built environment.

Notes

1 Jadwiga Krupinska, *What an Architecture Student Should Know*, trans. Scott Danielson (New York: Routledge, 2014), 118.
2 Eliel Saarinen as quoted in Matthew Frederick, *101 Things I Learned in Architecture School* (Cambridge: MIT Press, 2007), 92.
3 A comprehensive explanation can be found in: Valerio Di Battista, "Towards a Systemic Approach to Architecture," in *Systemics of Emergence: Research and Development*, ed. Gianfranco Minati, Eliano Pessa, and Mario Abram (New York: Springer, 2006).
4 Andrew Pressman, *Designing Architecture: The Elements of Process* (New York: Routledge, 2012), 16.
5 Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses* (Hoboken: John Wiley & Sons Inc., 2007), 64.
6 Stephen Kieran and James Timberlake, *Refabricating Architecture: How Manufacturing Methodologies are Poised to Transform Building Construction* (New York: McGraw-Hill, 2004), 7.
7 As a licensed architect practicing and teaching in the United States, much of this commentary is focused on US practices both professionally and academically.
8 Juhani Pallasmaa, *The Thinking Hand: Existential and Embodied Wisdom in Architecture* (Chichester: John Wiley & Sons, Inc., 2009), 63.
9 Nader Tehrani, "Foreword: A Murder in the Court," in *Strange Details*, by Michael Cadwell (Cambridge: MIT Press, 2007), xii.
10 These ideas were first explored in Chad Schwartz, "Investigating the Tectonic: Grounding Theory in the Study of Precedents." *The International Journal of Architectonic, Spatial, and Environmental Design* 10, no.1 (2015).
11 Simon Unwin, *Analysing Architecture*, 4th ed. (New York: Routledge, 2014), 5.
12 These ideas were first explored in Schwartz, "Investigating the Tectonic."

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Investigating the Tectonic
Unpacking the Guiding Principles

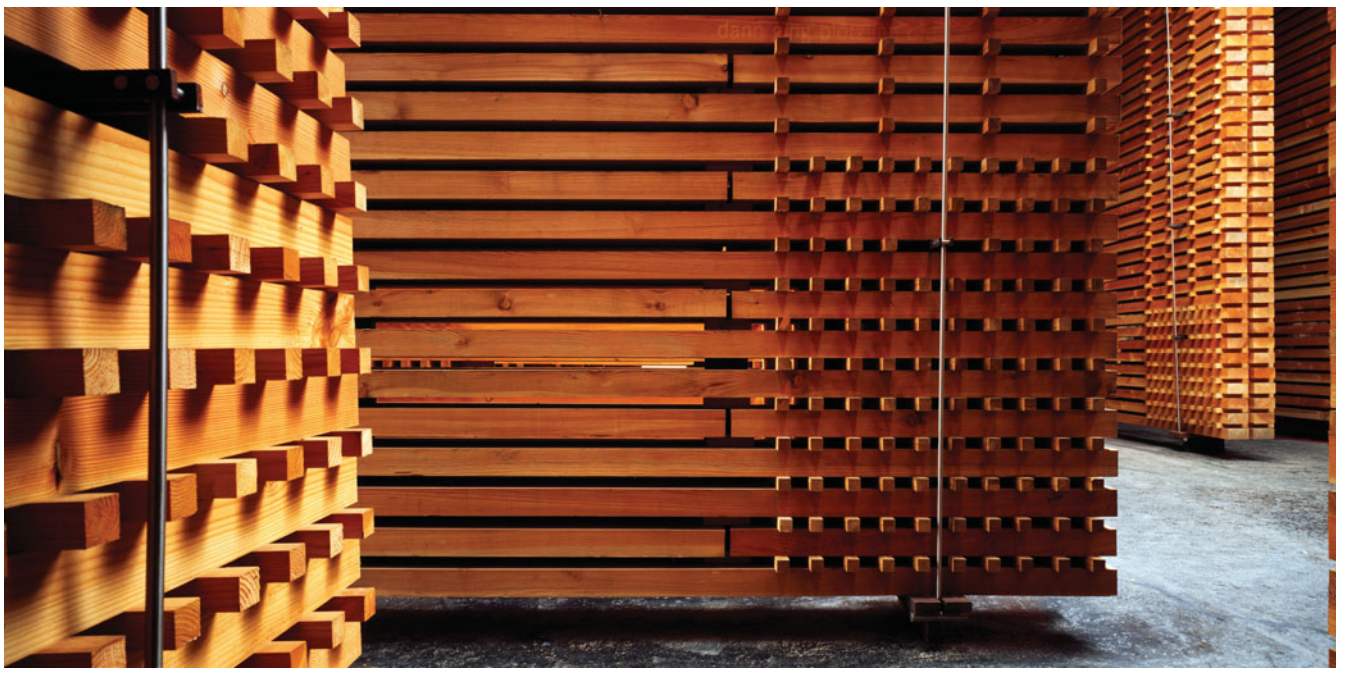
Kunstform = art form = the exterior or visible description of the underlying mechanically necessary systems (Kernform)

architectonic = the primer of architectural form given in accordance with the principles of tectonics.[2] For ease of reading, the word tectonic is typically used throughout the book.

We conceive of tectonics in the more narrow sense: the activity of building or of making objects of use, as soon as this activity is *ethically suffused*, and can rise to the charges placed upon it by intellectual or physical life. At that point, this activity not only seeks to satisfy mere needs by *forming a volume* in accordance with material necessity but instead may elevate that volume to a ***Kunstform***.

Thus, we conceive of the tectonic activity in two groups: the group of the *pure built work*, or the **architectonic**; and that of the smaller forms, of the *tectonic of useful objects*. Both are based upon the same principles of formal constitution. The architectonic, because of the scope of its duties and the compass of its means, requires that these principles be described more broadly and drastically.[1]

Karl Bötticher, *Die Tektonik der Hellenen*, 1844



00.1
Interior view of the Swiss Sound Box, Peter Zumthor, Hannover, Germany, 2000

> I think that the *dressing* and the *mask* are as old as human civilization and that the joy in both is identical to the joy in those things that led men to be sculptors, painters, architects, poets, musicians, dramatists – in short, artists. Every artistic creation, every artistic pleasure, presumes a certain carnival spirit, or to express it in another modern way, the haze of the carnival candles is the true atmosphere of art.[3]
>
> Gottfried Semper, *Style in the Technical and Tectonic Arts*, 1861

Tectonic theory is integrative; it examines "the interwoven relationship between space, function, structure, context, symbolism, representation, and construction. No single definition exists that conveys the full meaning of the term tectonic, primarily because it has evolved over time."[4]

In Europe in the mid-1800s, tectonic theory developed as a response to contemporary architectural practice. **Neoclassicism**, amongst other styles, was building a strong following in architectural circles and, as such, aesthetic appearance carried great weight in the evaluation of the built environment. Tectonic theory challenged the predominant assumption that what lay below the surface of a building was secondary to its ornamented cladding. It sought exterior expression for the underlying structural systems and mechanics that allow for the creation of built space.

Neoclassicism = a period during the eighteenth century and early nineteenth century characterized by the widespread use of Greek ornament, motifs, and characteristics in architecture and the arts

Tectonic expression was originally rooted in **historicism** focused on the ancient civilizations of Greece and Rome. However, 160 years of cultural change and technological advancement have necessitated a constant evolution of the built environment, leading to a shift in the understanding of tectonics. The original intent has been pushed and pulled; at times it has been simplified and at other times, perhaps corrupted. The soul of tectonics, however, remains: the belief that the construction of architecture – the **ontological** core of the built environment – is worthy of being expressed in the design of architectural space. In his lauded work *Studies in Tectonic Culture*, theorist Kenneth Frampton discusses the "constantly evolving interplay of three converging vectors, the *topos*, the *typos*, and the *tectonic*."[5] Frampton believes this integration of place, typology, and construction does not favor a particular architectural *style*, but does form a foundation for investigating our built environment.

historicism = the theory that past cultures were built on timeless principles that should be adapted for contemporary use

ontology = the study of the nature of existence or being or, in architectural terms, the study of the essence of a building that is simultaneously both its fundamental structure and its substance[6]

The etymological origins of *tectonic* reinforce its theoretical foundations. Tectonics derives from the Greek words *techne* (or *techné* or *tekhne* depending on the source) and *tekton*.[7] Originally, *tekton* translated as carpenter. Over time, however, the word evolved to include a broad definition of making and eventually led to the emergence of the term *architekton* or master builder. *Techne* refers to an act of making that is driven by both a predetermined goal and the existing knowledge necessary to achieve that goal. It "may be defined as the conscious, willful working or reworking of matter until it becomes not only what it was not but also what it was our intention that it should become."[8] It is the inclusion of utility or purpose in *techne* though that connects the terminology of tectonics to its conceptual origins in Europe.

The underlying concepts of tectonics arose in the late 1700s in Prussia. Between the late 1700s and the 1820s, the architectural culture of the Germanic states blossomed. The first German school of architecture was founded in Berlin in 1799 – the Berlin *Bauakademie*.

The founding of this school led to others, and by the mid-1820s, the development of critical scholarship was underway within the architectural circles of Berlin, Karlsruhe, Dresden, Stuttgart, and Munich. The emergent German lines of thinking (both architectural and non-architectural) would soon be considered amongst the most prolific in Europe.[9]

Immanuel Kant

Immanuel Kant, a well-known German scholar of the period, contributed to this development with an overarching theory of beauty (Figure 00.2). A component of this theory investigated two significant concepts of the era with respect to the fine arts: the ideas of *purpose* and *purposiveness*. *Purpose* is defined by Kant as "the object of a concept, in so far as the concept is seen as the cause of the object"[10] (Figure 00.3). Essentially, a maker has an idea of the need for an object, and this concept is the driving force for the object's development. This process involves the human acts of design and making.[11] *Purposiveness*, on the other hand, is "the causality of a *concept* in respect of its *object*."[12] To be purposive, an object needs to serve a useful function despite the fact that it was not purposely designed to do so. Scholar Harry Francis Mallgrave refers to purposiveness as "the essential inherent form by which the brain reads and appreciates art,"[13] finding higher purpose in the utilitarian purposeless. With this distinction, Kant laid the groundwork for the separation of the aesthetic qualities of architecture from its purpose-driven nature – an initial catalyst for the development of tectonic thought.

Kant went on to state that:

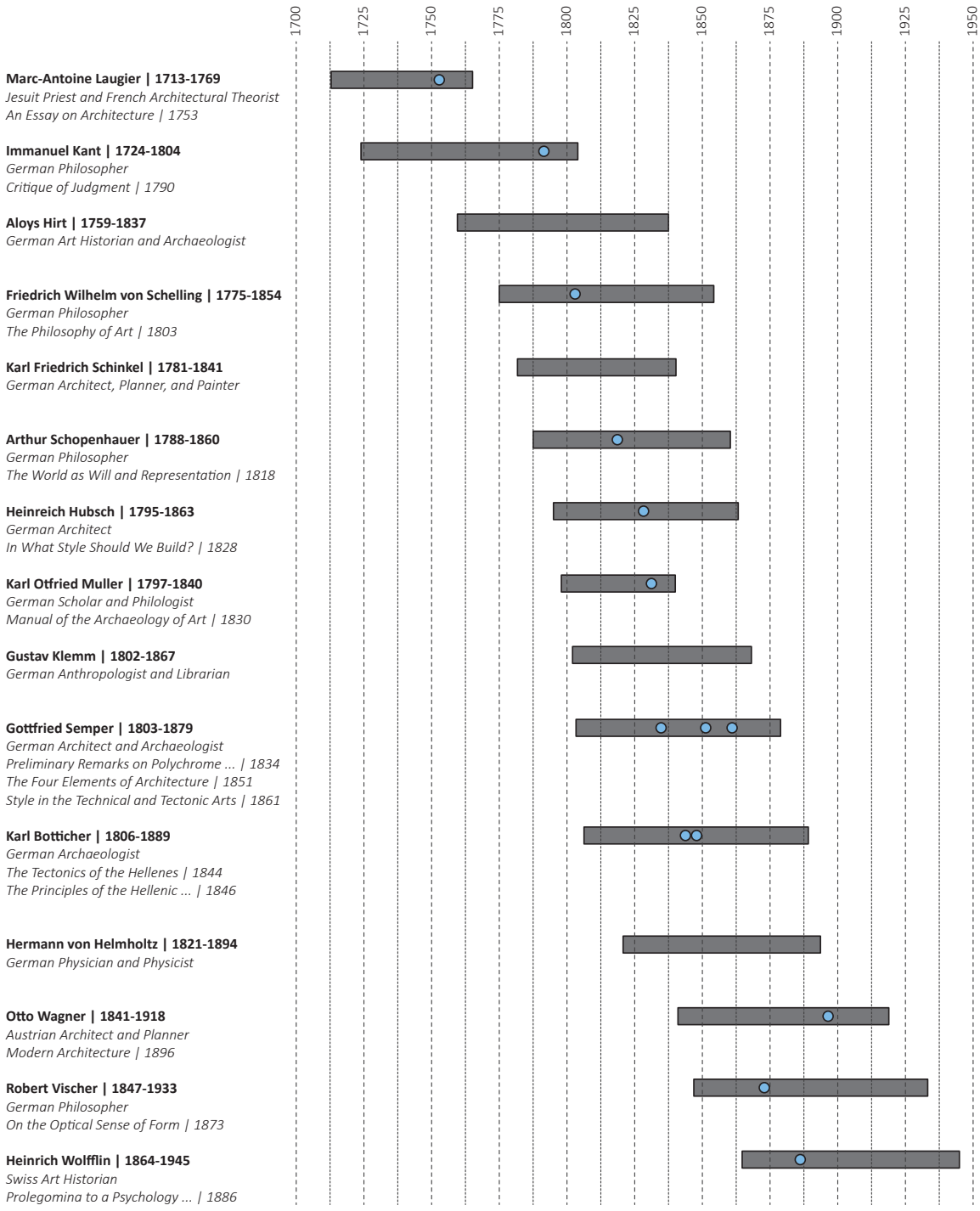
> There are two kinds of beauty: free beauty (*pulchritude vaga*), or merely dependent beauty (*pulchritude adhaerens*). The first presupposes no concept of what the object ought to be; the second does presuppose such a concept and the perfection of the object in accordance therewith.[14]

There is a significant line drawn here between the beauty of a work of art that holds no greater purpose and beauty that is founded with purposeful intent; for example, the creation of a building or a utensil. This distinction marks a prominent stance on the relationship between architecture and the other fine arts (music, painting, sculpture, etc.). For many early nineteenth-century scholars, including Kant, the reality of purpose and dependency on mechanical rules relegated architecture to the lowest level of the fine arts.[15]

Friedrich Schelling and Arthur Schopenhauer

structural rationalism = a nineteenth-century architectural theory stating that form should be based on the study of structural principles

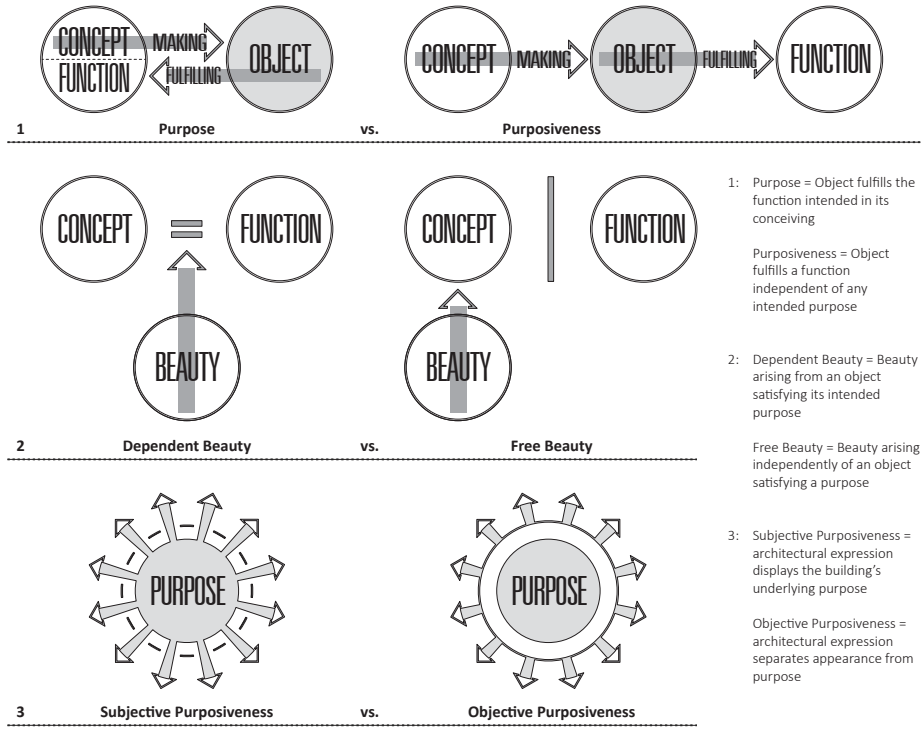
In many ways, this demotion of architecture planted the seed of architectural tectonics. In the early 1800s, while some scholars like Heinrich Hübsch fully embraced the purposeful core of architectural expression through the implementation of **structural rationalism** (providing hints of the Modern Movement to come), others, such as Friedrich Schelling and Arthur Schopenhauer, sought out ways to integrate the *purposeless* essence of art into the practice of architecture.[16] Schelling separated purposiveness into two divisions: subjective and objective. Subjective purposiveness referred to the primary role of architectural form as fulfilling or displaying the building's purpose.



*This chart is not meant to be a comprehensive list of contributors to the development of the theory of tectonics. It consists solely of individuals specifically mentioned in the text. The written works listed are also those referenced in the book.

00.2
Timeline of key individuals

00.3
Theoretical concepts



Objective purposiveness, on the other hand, required separating the appearance of a building from these utilitarian needs (Figure 00.3).[17] Pursuing the development of the objective, Schelling proposed that the appearance, or ornamented dressing of the building, should be inspired by nature and that there are three levels of quality to this practice. At the lowest level is direct imitation of natural form – such as plant life. This is followed by the imitation of advanced natural works like the human body. Finally, the highest level of incorporation is through the "invoking [of] nature's higher laws."[18] At this level, architecture is built on "arithmetical and geometric relationships"[19] (higher laws) and avoids imitation altogether in its development. Schelling described the integration of the highest reference of nature into architecture as "solidified music"[20] and believed that through this strategy, architecture would attain a higher purposiveness through the integration of the essence of art and architectural purpose.

Schopenhauer takes a different stance from that of Schelling.

> Now if we consider *architecture* merely as a fine art and apart from its provision for useful purposes, in which it serves the will and not pure knowledge, and thus is no longer art in our sense, we can assign it no purpose other than that of bringing to clearer perceptiveness some of those Ideas that are the lowest grades of the will's objectivity. Such Ideas are gravity, cohesion, rigidity, hardness, those universal qualities of stone, those first, simplest, and dullest visibilities of the will, the fundamental bass-notes of nature.[21]

Schopenhauer believed that architecture's only aesthetic objective is the demonstration of the continuous battle between the rigidity of the structure and gravity's pull towards earth.

Each building component plays a critical role in this conflict as "every part must have so necessary a relation to this stability that if it were possible to remove some part, the whole would inevitably collapse."[22] Schopenhauer concludes that architecture develops a relationship with the user not through symmetry, form, or other traditional architectural concepts but, instead, through "those fundamental forces of nature, those primary Ideas, those lowest grades of the will's objectivity."[23] However, like his contemporaries, he believed that to elevate the status of architecture, the architect must achieve aesthetic ends despite its subordination to the practicality of its core objective.

Karl Friedrich Schinkel

Amongst those who were influenced by Schelling and Schopenhauer was Karl Friedrich Schinkel, the preeminent German architect of the nineteenth century (Figure 00.4). Early in his career, Schinkel wrote that "purposiveness is the basic principle of all building [and] determines the greatest possible presentation of the Ideal; it is the character or the physiognomy of the building, its artistic value."[24] Examining Schinkel's body of work, however, reveals a broad exploration of the intent and reality of architecture, an investigation of both purpose and purposiveness leading to a wide range of expressions. In his later writings, Schinkel states: "Architecture is construction. In architecture everything must be true, and any masking or concealing of the construction is an error. The real task here is to make every part of the construction beautiful within its character."[25] These beliefs tied the construction of architecture directly to its outward projection. They began to bind together the utilitarian purpose of architecture with its exterior art-form. Among countless others, Schinkel's architectural attitudes provided a theoretical base for two individuals who studied and worked with him in Berlin in the middle of the nineteenth century: Karl Bötticher and Gottfried Semper. From these two men arose the theory of architectural tectonics.

00.4
The front façade of the Altes Museum, Karl Schinkel, Berlin, Germany
Source: © Michal Bednarek | Dreamstime.com

Karl Bötticher

Karl Bötticher arrived at the Berlin *Bauakademie* as a student in 1827 and studied under Schinkel.[26] In 1844, after qualifying as an architect and teaching at several other schools, Bötticher was appointed a professor of architecture at the *Bauakademie*. During the 1840s, he wrote extensively on his forming theory of architectural tectonics. The most comprehensive of his writings was *Die Tektonik der Hellenen* (*The Tectonic of the Greeks*), which was first published in 1844 and soon after became the principle architectural text at the *Bauakademie*.

In addition to his mentor, Bötticher was influenced by a range of ideas presented by other key thinkers of the late eighteenth century and early nineteenth century including Schelling, Schopenhauer, Hübsch, and Schinkel's mentor Friedrich Gilly. Despite these relationships, Bötticher's ideas about architecture ran contrary to numerous normative beliefs of the era. Many philosophers of the period elevated the individual, while Bötticher elevated the social; these philosophers saw external nature as the starting point for symbolic representation, but Bötticher started with the internal mechanical workings of the building; these philosophers saw utilitarian purpose (dwelling needs, materials, etc.) as subservient to artistic representation, and Bötticher saw exactly the opposite.[27]

Bötticher was also a classical archaeologist; his mindset and approach to architecture were significantly affected by his knowledge of past. While teaching at the *Bauakademie*, Bötticher was inspired by another archaeological mind – that of antiquities professor Aloys Hirt. Hirt's writings focused on classical rules of beauty. He believed that contemporary architecture was best conceived using rules, laws, and principles derived from ancient sources, particularly the Greek. Bötticher adapted Hirt's position and drew heavily on ancient Greek architecture in the development of his theory of tectonics.

Bötticher's tectonics also built on Schinkel's emphasis on the importance of space in the development of a building. Bötticher believed that architectural design should center on the enclosure of space,[28] citing once again the ancient Greek: "The Hellenistic building, in both plan and structure, proves itself to be an ideal organism, one that is skillfully articulated in order to produce a spatial entity."[29] In this spatial construct, Bötticher sought "a synthesis between the ontological status of the structure and the representational role of the ornament."[30] However, the ornamental cladding of the building could not obscure the construction that it adorned; instead, this cladding needed to express its underlying form. The integration of ornament and core was a new approach, and it was contrary to current practices. While many theorists were focused on the imitation of objects or styles, Bötticher decided to focus his efforts on illuminating a building's internal processes, utilitarian nature, and "infinite universe of forces."[31]

Gottfried Semper

Gottfried Semper was educated as an architect in Paris in the late 1820s after having already studied mathematics at the University of Göttingen in the first half of the decade.[32] In France, he studied at the private school of Franz Christian Gau, an architect and archaeologist who is credited with reviving Gothic architecture in Paris during the first half of the nineteenth century. Soon after, Semper began his archaeological travels in Italy and Greece, where he

found himself in the center of a great architectural debate regarding classical **polychromy**. On his return north in 1833, Semper stopped in Berlin to discuss his findings with Schinkel, who would prove to be integral to Semper's career as an architect in the coming years. In 1834, Semper was named professor at the Dresden Academy of Fine Arts and enjoyed great professional success until 1849 (Figures 00.5 and 00.6). In that year, Semper's political activism would doom him to exile as he found himself on the losing side of the Dresden Uprising. Banished from Germany and unable to practice successfully as an architect abroad, Semper began his work as a theorist. Over the next decade, Semper published several significant books and papers including *The Four Elements of Architecture* in 1851 and *Style in the Technical and Tectonic Arts* in 1860.

polychromy = the practice of using color in the design of architecture

The relationship between Semper and Bötticher was established on December 13, 1852. At this time, Bötticher had been actively investigating architectural tectonics for over a decade. However, Semper had not yet been introduced to Bötticher's writings. On this date, it is recorded that Semper checked out Bötticher's *Die Tektonik* from the library at the British Museum. "What he read must have given him a shock: views that he had considered to be his most original had been voiced by someone else in a book published almost ten years before."[33] Despite initial outrage, Semper agreed with, and may have even adopted, some of Bötticher's ideas, including the term *tectonic*, which Semper had not used prior to this point in time.[34]

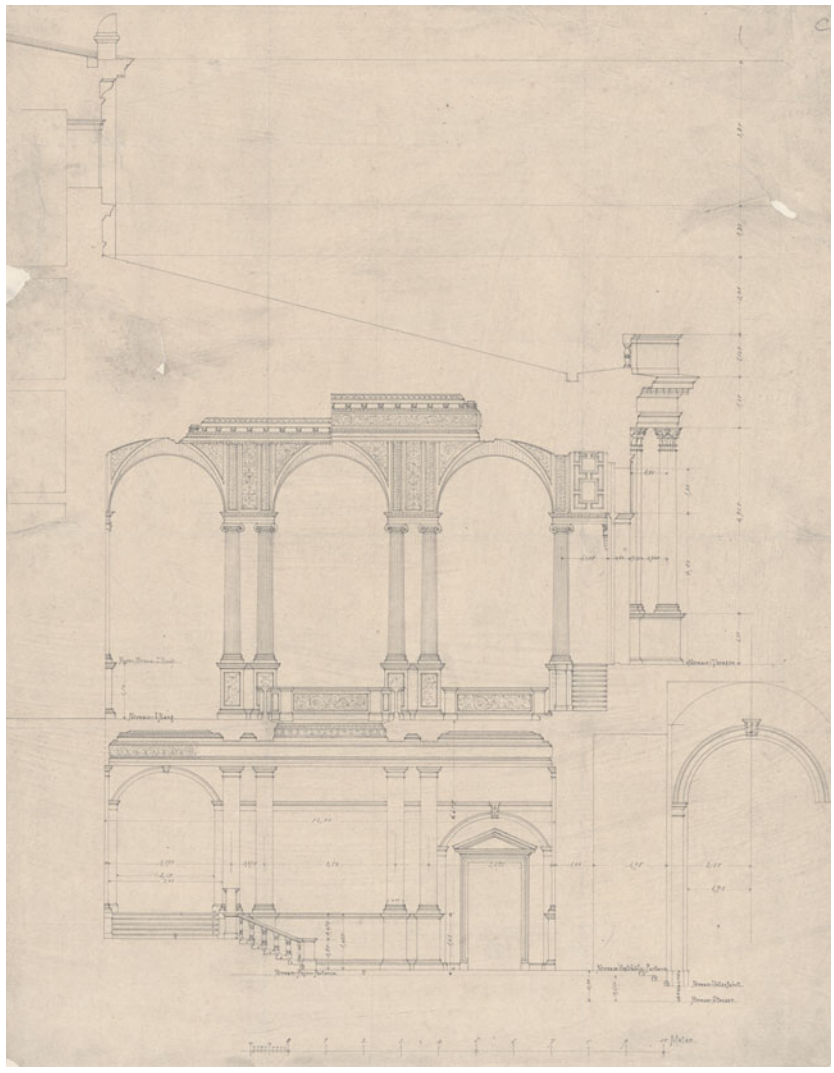
Many of Semper's primary beliefs, however, depart from Bötticher's line of thinking despite the two having shared several common catalysts for their work, including Schinkel's mentoring. Semper was inspired by the growing science of anthropology. He sought to study not just the creation of built form, but all human artifacts. He also departed from contemporary convention by examining cultural work through ritual use rather than aesthetic appearance.[35] These lines of inquiry might be taken for granted today, but in the mid-nineteenth century, this approach was cutting-edge philosophy. Semper's extensive anthropological studies led him to develop a series of principles on the origins of building. He believed that architecture developed not from construction, but from the need for enclosed space. This focus on space was derived from examining the development of social separation between the interior and exterior worlds in primitive cultures. Semper's particular fixation on the cladding of space led him to further develop these ideas into his theory of *Bekleidung* (dressing). In this theory, Semper states that "*the beginning of building coincides with the beginning of textiles*"; this would later develop into an examination of the relationship between the making of crafts and the making of architecture.[36]

Tectonic Principles[37]

Precedent

> Just as the abundance of technical means is an embarrassment to us, even more so are we perplexed by the immense mass of historical knowledge, which increases daily. Every trend of taste is familiar to us, from the times of the Assyrian and Egyptian styles to the age of Louis XVI and beyond. We can do everything, we know everything except ourselves.[38]
>
> Herrmann, *Gottfried Semper*, 1984

00.5
The front façade of the Zweites Hoftheater (it was reconstructed in the 1870s after a fire destroyed must of the structure), Gottfried Semper, Dresden, Germany
Source: © Delstudio | Dreamstime.com



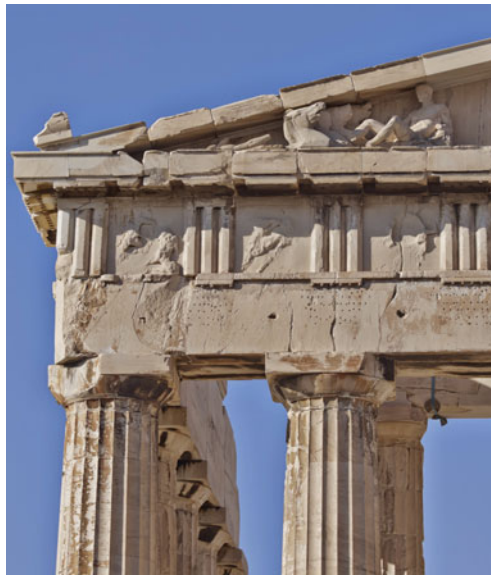
00.6
Section of the Zweites Hoftheater, Gottfried Semper

In this quote, Bötticher emphasized a growing understanding of history and its impact on the practice of architecture, but also urged caution. He, along with Semper, believed that the "senseless copying of historical work" became easier to do with increased knowledge of historical styles.[39] But studying precedent is not about choosing an aesthetic appearance and pasting it into the contemporary landscape. On the contrary, both theorists urged moving beyond eclecticism and sentimentality to a deeper understanding of the principles and culture that could properly inform contemporary work.[40]

As discussed earlier, one of Bötticher's primary inspirations was the architecture of the ancient Greeks. Hellenic building practices were under intense scrutiny in the beginning of the nineteenth century in Europe, and Neoclassical tendencies permeated the fine arts. Great debate existed regarding the source of inspiration or precedent for the Greek culture. Bötticher believed that Hellenic tectonics arose from the "potency of the Hellenic race of expressing any concept in an artistic way."[41] Essentially, he surmised that Greek architecture and art did not evolve from outside sources but was, instead, self-generated by the Greeks. Semper, with his anthropological mindset, disagreed, believing "nothing arose in isolation and nothing that had ever been created ceased to have an effect."[42] He offered the following response to Bötticher's theory:

> With shortsighted zeal, a fanatic and fallacious Hellenomania took the classical spade and systematically cut off the widespread roots and fibers that provided the lofty plant of Hellenic civilization with the basic conditions for its existence and gave it support.[43]

This disagreement was expressed prominently in the analysis of the Greek temple (frequently cited as a microcosm for Greek architecture as a whole). Hirt, the archaeologist, had determined through his research that the stone construction found in Greek architecture had evolved from earlier wood construction.[44] His determination centered on the evidence



00.7
West pediment of the Parthenon showing representation of wood construction, Athens, Greece
Source: © Dpikros | Dreamstime.com

of wood construction detailing in many stone temples (Figure 00.7). This positon was not new; in the middle of the nineteenth century, Marc-Antoine Laugier proposed similar ideas in *An Essay on Architecture*.[45] Semper paralleled Hirt's beliefs on the origins of temple construction, but not his reasoning. Semper, instead, believed that the timber-like forms found on Greek temples were representational ornamentation inspired by "features originally used to tie down textile fabric covering the roof."[46]

This premise was countered by Hübsch who believed that structural rationalism and economic considerations would have prevented such a transfer between vastly different materials with different structural properties. Bötticher sided with Hübsch, believing that the Greek temple had always been constructed with stone as its principle material. This difference of opinion did not mean Bötticher and Semper's readings of Hellenistic building were entirely different. They each believed that the Greeks derived their building principles from nature and that contemporary ornamentation must be derived from these Hellenic principles. Bötticher had a "classicistic view of Greek architectonic forms" and developed a mindset centered on the pictorial representations of the natural environment,[47] while Semper's beliefs paralleled Schelling's theory of ornament, discussed earlier; symbolic ornamentation must not directly imitate nature but should instead be inspired by its innate qualities.

Beneath the surface, Bötticher looked elsewhere for construction precedent. He believed the Gothic style was far superior to that of the Greeks with respect to construction technology. He states, "[t]hose who dismiss it as Germanic and barbaric overlook the enormous step forward represented by the medieval system of widely spanned spaces, with its escape from the structural limitations of material."[48] The pairing of Gothic constructional technique and Hellenic ornament defines Bötticher's concept of architectural tectonics.

Beyond the precedent of the Greeks, Semper had other inspirations as well. Unlike Bötticher, who looked forward in time, Semper looked backwards to the fundamental beginnings of the built environment. Here, he would find his greatest inspirations in a comprehensive study of primitive vernacular building.

Place

From his research on vernacular building, Semper was able to identify two fundamental typologies: the wall-dominated courtyard building and the roof-dominated roof-hut. These two configurations were driven by local conditions of culture and environment; they were rooted to *place*. The warmer climates of the south forced the development of the courtyard-style building in response to solar conditions, while the colder climates further north necessitated protection from heavy precipitation and led to the development of the roof-hut.[49] As in the earliest buildings, the relationship to place continues to significantly impact the design and construction of our built environment. From the foundations to the roof, architecture can (and should) be configured to meet the local social, cultural, and climactic needs.

The site is also influential in the production of built space. Vittorio Gregotti says:

> Before transforming a support into a column, roof into a **tympanum**, before placing stone on stone, man placed a stone on the ground to recognize a site in the midst of an unknown universe, in order to take account of it and modify it.[50]

tympanum = the triangular space below the traditional roofline of a temple

Marking the ground is the first stage of the creation of architecture, a central tenet that separates it from the other fine arts. Buildings must be physically attached to the earth in order to transfer loads and resist gravity's pull. In addition, "the actual start of cultural staging coincides with the appearance of ownership: a principle concomitant with fixed abode and legal regulation."[51] Therefore, the preparing of the earth provides a stable foundation for the physical building as well as a cultural connection to place through the marking of territory. With each of these roles, "[o]ne cannot disregard the enormous importance of the plane separating above and below. That plane is basic to the tectonics of building. . . . It is the beginning of our taking possession of the land."[52] "Situated at the interface of culture and nature, building is as much about the ground as it is about built form."[53] Bulldozing the irregular topography of a site to create a flat working plane promotes placeless architecture. However, stepping the building to match that uneven terrain locates the tectonics of construction within a specific context or place (Figure 00.8).

Contemporary design practices are becoming highly responsive to their place in the world. Annette LeCuyer has defined the most sensitive of these projects as exercises in the radical tectonic.[54] She states:

00.8
Hillside home Casa Tóló, Álvaro Leite Siza, Alvite, Portugal, 2005