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HISTORY'S *STOFFWECHSEL*: INTERCHANGE AND  
ALTERNATION IN THE CONTENTS OF SEMPER'S  
*DER STIL*

**ABSTRACT:** Compelled by the shifting socio-cultural conditions of architecture's present, the strategy of this brief contribution to the theme of "Change" is to move approximately a century and a half back and focus on a formative moment for architectural histories and theories. The main object of the essay is the process of *interchange* between theory and history during the emergence of the first so-called "world histories" of architecture in the 19<sup>th</sup> century. I choose to focus on the writings of architect and theorist Gottfried Semper, whose writings have made a theoretical contribution to the invention of architectural history within the shifting cultural and political milieu of the long nineteenth century. More specifically, I describe the interchange between history and theory that takes place in his *Style in the Technical and Tectonic Arts, or, Practical Aesthetic* as reflected in the asymmetrical relations between aesthetics and form, as well as technics and history in the author's table of contents. Ultimately, the essay presents Semper's well-known metabolic concept of *Stoffwechsel* as a historical process based on an oscillating constancy of aesthetic, material, and technical forms.

**KEYWORDS:** Gottfried Semper, historiography, architectural theory, style, metabolism (*Stoffwechsel*)

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## PROLEGOMENA

More than fifteen years ago, when I was asked to curate the lecture series of Princeton's School of Architecture for the fall semester of that year, I chose the one-word theme "Change." The rather abstract prompt sent to invited speakers read approximately as follows:

Perhaps the problem with change is that its concept has not changed. Once new technologies or building patterns replace older systems, they become equally rigid and unchangeable as their predecessors. Is it possible to think of change as a dynamic process—a constantly evolving process that includes accidents, periodic shifts, or reinvocations of earlier epistemological techniques and working methods? And how can architecture, a discipline traditionally associated with permanency and solidity delineate such spiraling transitions? Can change be contained by mere provisions in the program and the supplementation of innovative materials? And can it be substantially revamped by a "new style" or "new attitude"? Surrounded by a world of major social and political upheavals, architects, theorists and historians, are asked to reflect on how we can modify the ways change is perceived and created while transitioning from a historical to a contemporary perspective and from a local to a global scale.<sup>1</sup>

The lecture series happened in the fall of 2008, the year of a U.S. presidential election, in which the winning party campaigned under the banner of "Change," spearheading an unprecedented political transition. Little could we suspect then of the outcome of future elections inside or outside the U.S. that had a vastly different and strongly reactionary attitude towards change in politics and culture, including architecture, calling for a return to hyperinflated monumentality.<sup>2</sup> While ruminating on the bewildering changes that happened during the decade and a half following the Princeton lecture series, I find myself writing an article on architecture and change in response to the invitation of Catherine Ingraham and the *Khōrein* editors during another election year in the U.S.,

<sup>1</sup> Lecture Series on "Change," School of Architecture, Princeton University, Fall 2008. Statement modified.

<sup>2</sup> See for example the recent discussion of architecture in populist contexts in J. W. Müller, "Populism's Building Complex; or: Is There Such a Thing as Populist Architecture?" *Journal of Populism Studies*, 2023, pp. 1–15, <https://www.jps.populismstudies.org/populisms-building-complex-or-is-there-such-a-thing-as-populist-architecture/> (accessed 1 June 2024).

whose result prognosis is disconcertingly changing every week. During the years following the last two elections, collective movements in the areas of social and environmental justice have stridently called for systemic changes in all fields, including architecture. The inequitable relations marring architecture's professional and educational circles also necessitate a revision of its many histories and theoretical stances. Compelled by the shifting realities of architecture's present, the strategy of this paper is to move approximately a century and a half back, and focus on a formative moment for architectural histories and theories during an analogously turbulent political era. I refer to the moment of the institutionalization of architectural history and theory in professional schools and voluminous book publications in response to the shifting sociopolitical environment of the mid-19<sup>th</sup> century informed by a rapidly industrialized and increasingly globalized economy bolstered by colonization.

The object of this necessarily brief essay, only a prolegomenon to or fragment of a larger study, is the process of change or rather the *interchange* between theories and histories during the emergence of the first so-called "world histories" of architecture in the 19<sup>th</sup> century, which have lately become the object of renewed interest of study.<sup>3</sup> To do so, I choose an author that is not normally examined in relation to these voluminous histories, yet whose writings have made a theoretical contribution to the invention of architectural history within the shifting cultural and political milieu of the long 19<sup>th</sup> century.

I refer to Gottfried Semper and the interchange between history and theory that takes place throughout his writings on art, architecture, and design and more specifically his major opus *Style in the Technical and Tectonic Arts, or, Practical Aesthetic*.<sup>4</sup> Here, I am less interested in the technical shifts described in Semper's well-known formulation of "material change" via his use of the term *Stoffwechsel* but rather his tracing of historical change as well as history's shifting relation, including synergy and

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<sup>3</sup> P. Brouwer, M. Bressani, C. D. Armstrong, *Narrating the Globe: The Emergence of World Histories of Architecture*, The MIT Press, Cambridge, Mass., 2023.

<sup>4</sup> G. Semper, *Der Stil in den technischen und tektonischen Künsten; oder, Praktische Aesthetik: Ein Handbuch für Techniker, Künstler und Kunstfreunde*, vol. 1. *Die textile Kunst*, Verlag für Kunst und Wissenschaft, Frankfurt am Main, 1860 (2<sup>nd</sup> edition: Friedrich Bruckmann, Munich, 1878); vol. 2. *Keramik, Tektonik, Stereotomie, Metallotechnik*, Friedrich Bruckmann, Munich, 1863 (2<sup>nd</sup> edition: Friedrich Bruckmann, München, 1879). English edition: *Style in the Technical and Tectonic Arts*, The Getty Research Institute, Los Angeles, 2004.

resistance, with his “theory of artistic forms (*Kunstformenlehre*).”<sup>5</sup> Historiographic change is not limited to temporal transitions but expands to a multitude of spatial and epistemological shifts that agitate the very structure and texture of history. The grey area of interchange between fluctuating physical and epistemological parameters becomes the oscillating ideogram of a historiographic version of the architect’s theory of material change or metabolism (*Stoffwechsel*).

The main question apropos change in the collision of historiography and biography in Semper’s case is the following: What is the historical attitude towards change of an architect who has witnessed the prospect of radical transformation in the emergence and collapse of a major political revolution? What is the role of writing, architecture, and the production of books in the aftermath of an aborted shift that provoked a vast historical trauma in European societies, as well as a personal catastrophe in the architect’s life and professional career? In Semper’s writings, architecture’s relationship to change remains perpetually parabolic; like the revolution it never reaches its goal yet it is propelled by its very failure to do so. Parabolic transformation present in the dynamic form of the ancient projectiles, the architect spent several years of his life trigonometrically calculating<sup>6</sup> as well as the shape of the tails of comets he described (after Newton’s *Principia*) in a long footnote of his Prolegomena to *Style*<sup>7</sup> is the graphic emblem of change, allegorizing the dynamic transformations of nature within the curvilinear forms of ancient architecture. And yet there are plenty more transformations happening in the compendium of *Style* that take place beyond the formal level on the domain of physical, socio-political, and architectural revolutions, all of which become part—as is the norm in histories delineated by architects—of an elaborate design.

<sup>5</sup> See alternate book title “*Kunstformenlehre oder der Stil*” in printed preliminary inner title page of *Der Stil* with handwritten emendations by the architect dated 1859; reproduced in W. Hermann, *Gottfried Semper: Theoretischer Nachlass an der ETH Zürich Katalog und Kommentare*, gta-Birkhäuser, Zurich, 1981, p. 138. On Semper’s unpublished manuscript on “*Kunstformenlehre*” (1856), see E. Chestnova, *Material Theories: Locating Artifacts and People in Gottfried Semper’s Writings*, Routledge, London/New York, 2022, pp. 150–152.

<sup>6</sup> G. Semper, *Über die bleiernen Schleudergeschosse der Alten*, Verlag für Kunst und Wissenschaft, Frankfurt am Main, 1859.

<sup>7</sup> G. Semper, *Der Stil in den technischen und tektonischen Künsten; oder, Praktische Aesthetik: Ein Handbuch für Techniker, Künstler und Kunstfreunde*, vol. 1, pp. xxxv–xxxvii; G. Semper, *Style in the Technical and Tectonic Arts*, pp. 98–100, n. 13.

## ALTERNATING TABLES

Attentive readers of *Der Stil* may notice a certain asymmetry between the table of “contents (*Inhalt*)” of the first and that of the second volume of the architect’s incomplete magnum opus—a difference based on size as well as a change in format that remained unchanged in both editions published during the architect’s lifetime.<sup>8</sup> The table of contents of the first volume on “Textile Art” is considerably longer and more analytical than the much shorter and epigrammatic table of the second volume listing only the titles of the “main chapters (*Hauptstücke*)” on ceramics, tectonics, stereotomy, and metallurgy. And yet following the first volume’s initial sections, including the theoretical foreword of the “Prolegomena,” the first main chapter of the “Introduction” and the second equally introductory *Hauptstück* on the “classification of the arts,” the voluminous exposition on “Textile Art (*Textile Kunst*)” contains only two “main chapters,” on the “General-Formal (*Allgemein-Formelles*)” and the “Technical-Historical (*Technisch-Historisches*)” aspects of textiles, similar to the bi-partite chapter structure of the sections on ceramics, tectonics, and stereotomy in the second volume, yet not in the final section on metallurgy, which notably contains only one chapter.

The author’s twofold investigative method alternating between the “General-Formal” and the “Material-Historical” aspects of artifactual techniques are eventually numbered by the architect as “A.” and “B.”; and the Roman numbering is periodically repeated in each of the first four sections of the *Styl*e’s second volume. No trace of “A and B” exists though in the first volume of *Der Stil*—neither in its first nor its second “revised” edition of 1878, in which a correction in the table of contents could have easily been made.<sup>9</sup> Perhaps in an effort to streamline the contents of both original volumes in a single tome, the English translation of *Styl*e edited by Harry Mallgrave for the Getty Research Institute’s “Text and Documents” book series extends the “A and B” order in the table of contents of the first volume for the two main chapters on textile art, while foregoing their analytic descriptions.<sup>10</sup> The original table of contents of the first volume in the German editions of the work may lack the letters “A.” and “B.,” yet they contain an analytic list on the “General-Formal”

<sup>8</sup> The first edition of the two volumes of *Der Stil* were published in 1860 and 1863 and the second “revised” edition in 1878 and 1879 (see note 4 in this paper).

<sup>9</sup> Cf. “*Inhalt*” in both volumes of the two German editions (see previous note).

<sup>10</sup> G. Semper, “Contents,” in *Styl*e in the Technical and Tectonic Arts, p. v.

which becomes significantly more elaborate for the “Technical-Historical” aspects of textiles. The first subsection list (“General-Formal”) contains the “primary objectives (*erste Zwecke*)” of textile arts, including the “string (*Reibung*),” “band,” “cover (*Decke*),” and “seam (*Nabt*)” motifs and the second (“Technical-Historical”) three different “style” classifications following the “mode of preparation according to the raw materials (*Robstoffe*)” including “animal furs (leather),” “caoutchouc [rubber],” “lacquers,” “flax,” “cotton,” “wool” and “silk” and according to the forms in which these materials are weaved including “bands and threads,” “knots,” “loop stitch,” “plaiting,” “weaving,” “stitching” and “dyeing.” The volume closes with two additional subsections on “Clothing (*Kleiderwesen*)” and an analytic description of the “Principle of Cladding in the Art of Building (*Das Prinzip der Bekleidung in der Baukunst*)” according to several ethnicities and regions, starting from New Zealand and Polynesia, China, India, Mesopotamia, Phoenicia and Judea, Egypt “(Old and New Kingdom),” Asia Minor, Greece, and Rome and concluding with the historical periods and corresponding geographies of “Eastern” and “Western” Middle Ages and finally the (Italian) Renaissance. Note that the actual text of the book contains several other motifs, materials, technical forms, and ethnic or national groups not mentioned in the table of contents, such as the “hem” and “floor dressings” in “general” motifs, or the “neglected technique of furriery” among the treatment of natural materials including “tree bark.” Finally, in the section on national cultures, Chaldea and Assyria are also not present on the table having been subsumed under a large section on “Mesopotamia.” The table of contents is more or less a selective abstraction of the book’s opulent accumulation of objects, materials, techniques, and ethnicities. Moreover looking at the contents of the first volume as a whole, it might appear that its final section on “Cladding (*Bekleidung*)” carries most of the weight of history including the rather infamous baggage that comes with it *vis-à-vis* the racially charged distinctions made by the architect about the architectonic skills of these inequitably equipped peoples.<sup>11</sup> And yet such “historical” classifications are not limited to the section on cladding but expand to the rest of the “technical-historical” or even the “general formal” motifs of textiles.

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<sup>11</sup> C. L. Davis II, “Beyond the Primitive Hut: Gottfried Semper and the Material Embodiment of German Character,” in *Building Character: The Racial Politics of Modern Architectural Style*, University of Pittsburgh Press, Pittsburgh, 2019, pp. 70–112.

In spite of its omissions, the elaborate table of contents for the first volume makes evident the *Style*'s main structural order alternating between the general forms of theory and the objects or subjects of history. Theory is represented by general "motifs" or "types" and history by raw or prepared materials, techniques, clothing, and peoples. There is however an obvious spilling or overlap between these theoretical and historical categories. For example, "bands" appear both in the "General-Formal" and the "Technical-Historical" chapters. And could not the section on the "knot," made popular by Semper's signature drawings of looping cord knots, which is actually placed in the "Technical-Historical" section, also fit in the "General" area among the formal "ur-motifs" of strings, bands, and seams? A possible motivation behind such dis/placement might be that the "knot" is tightly linked by the architect to the constructive techniques of "netting" and "plaiting" that give birth to the mat and the carpet and eventually the fence and the wall. Every "historical-material" object contains a "theoretical-formal" type at its inner core. A covert change among the manifold objects of history discloses a constancy and persistence among theoretical types. The band and the knot are caught up with the technologized forms of life and so they end up switching positions in the architect's carefully *tectonicized* table. In spite of its linear order, the table itself is a living form of organization mobilized by the virtual or physical transpositions that take place in its rhythmic chapter list.

Speaking of the text's structural transpositions, note also that the chapters titled "General-Formal" in the sections on "Textiles" in the first volume and "Tectonics" in the second are alternatively titled "Aesthetic-Formal" in the sections on "Ceramics" and "Stereotomy" also in the second volume. Thus, the terms "General" and "Aesthetic" alternate throughout the table of contents of this volume. When does the "aesthetic" substitute or become the "general" or how far can Semper's "practical aesthetic" be generalized? The table itself constructs a "general-aesthetic" practice that converts or generalizes the "aesthetic" into a subtle interchange with all other terms that participate in the architect's table. Perhaps ultimately, the essential change lies in the dash that connects the "aesthetic" or the "general" with the "formal" as well as the "technical" with the "historical" in a single formulation generalized in the title and the content of each chapter. The reciprocal transformation of the "aesthetic" to the "general" and vice versa not only restructures the ecology of the book's contents but also informs the architect's historical *method* and the way he partitions his text, which ever so slightly shifts while moving

towards the conclusion of the second volume, yet only to reaffirm that his historical pattern has *essentially* stayed the same.

The table's covertly pliable structure is indeed rehearsed in the sections of the second volume on ceramics and tectonics in which the divisions between theories and histories become even more porous. However, in the section on stereotomy, the architect notes the difficulty in maintaining the "order," meaning the partition between "form" and "material" or "aesthetics" and "history" he had followed so far:

Thus, the technique with which we are concerned [stereotomy] would seem to lack its own distinct domain for its most frequent and most important applications. If this were true it would be difficult to keep to the sequence observed up to now, according to which questions about absolute functional-formal matters are dealt with first, and technical-historical matters follow. But did stereotomy in fact have no domain original to it? If one could be identified, or attributed to it with some justification, that would provide a starting point that would justify abandoning the sequence of ideas we have followed until now.<sup>12</sup>

And while in the section on stereotomy the division into A. and B. is even schematically preserved, the same methodological design "sequence" collapses in the *Style's* final part on metallurgy:

Metalwork was promised a heading of its own, to come at the conclusion of volume 2, even though it is not possible to define a separate formal field for it. As no fifth field can be added to the topics of weaving, pottery, carpentry, and masonry, we must now abandon the order followed so far. There is no need for a special chapter on general-formal matters, because everything contained in chapters 3, 5, 7, and 9 is also relevant to the metalworker's art. The flexibility of his material embraces all branches of technology, which the metalworker simply handles in his own way, conditioned by the material. Thus, stylistic questions of a technical-historical nature are all we have to consider in this field. We can also deal with this as briefly as possible, given the limits of our book and its purpose (which is aesthetic rather than technological), and by referring the reader to earlier material.<sup>13</sup>

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<sup>12</sup> G. Semper, *Style in the Technical and Tectonic Arts*, p. 726.

<sup>13</sup> *Ibid.*, p. 824.



In other words, there's nothing left to be said about the "General-Formal" side of metallurgy because everything has already been analyzed in earlier sections on all other techniques preceding textually, but not historically and against archaeological evidence, the development of metallurgy—one of the architect's starting points in his first explorations of the world of objects.

According to the logic of *Stoffwechsel*, formal patterns stay essentially the same while transitioning from one material to the next by leaving a physical imprint.<sup>14</sup> New material embodiments carry their predecessors from other species of matter in their unchangeable forms, as in the transition from the wooden to the marble Ionic capital in Greek architecture illustrated in the second volume of *Styl*.<sup>15</sup> Here it is metal, and before that stereotomy and stone, that regurgitated all forms previously crafted in textiles, ceramics, and tectonic wooden structures. If we conceive of change as a shift, then the latter does not actually exist in *Stoffwechsel*. Material change and the alternation of chapter "types" construe a form of oscillating constancy—the advent, prologue, or the aftermath of a historicized view of architectural theory.

The continuity afforded by the dash in the table's terminological combinations and the oscillating constancy of its alternating substitutions disclose that perhaps the subtlest stylistic change in *Der Stil* are the methodological shifts enacted by the historian rather than the material developments described by the architect, even if the two *are* or through the transformations unfolding in the book eventually *become* the same person.

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<sup>14</sup> From the growing literature on Semper's concept of "*Stoffwechsel*," see the recent articles by E. Chestnova, "The House that Semper Built," *Architectural Theory Review*, 21, 1, 2017, pp. 44–61; M. Gnehm, "Gottfried Semper et le métabolisme du revêtement architectural," *Gradbiva*, 25, 2017, pp. 106–123; M. Espagne, "Gottfried Semper: histoire de l'art et politique," *Revue germanique internationale*, 26, 2017, pp. 71–82 (on *Stoffwechsel* p. 80).

<sup>15</sup> G. Semper, *Der Stil*, vol. 2 (1863), p. 262.

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